

EDITOR:

Please note

Pages 1-404, part 7, bulletin 100, were typed several years ago and follow a different form than the remainder of this MS. Beginning with page 405 the usual form for manuscripts published by the U. S. Nat. Mus. has been followed.



THE FISHES OF THE GROUPS STOMIATOIDEI, SYNBRANCHII, APODES, HETEROMI,  
LYOPOMI, INIOMI AND RELATED FORMS, MOSTLY BATHYPFLAGIC, COLLECTED BY  
THE UNITED STATES BUREAU OF FISHERIES STEAMER "ALBATROSS", CHIEFLY IN  
PHILIPPINE SEAS AND ADJACENT WATERS.

By

Henry W. Fowler

Academy of Natural Sciences of Philadelphia.

By

HENRY W. FOWLER

Of the Academy of Natural Sciences of Philadelphia.

LIST OF ILLUSTRATIONS

Astronothinae

Astronothinae

heonothinae

Stenotrichidae

Elaeostomias

E. philippinum n. sp.

microdentostomias n. sp.

u. orientalis n. sp.

Pseudostomias n. sp.

P. myersi n. sp.

melanostomias <sup>stewarti</sup> ~~philippinum~~ n. sp.

globulifer n. sp.

11

11

verechi n. sp.

THE FISHES OF THE GROUPS STOMIATOIDEI, SYNBRANCHII, APODES, HETEROME,  
LYOPOMI, INIOMI AND RELATED FORMS, MOSTLY BATHYPELAGIC, COLLECTED BY  
THE UNITED STATES BUREAU OF FISHERIES STEAMER "ALBATROSS", CHIEFLY IN  
PHILIPPINE SEAS AND ADJACENT WATERS.

By

Henry W. Fowler

Of the Academy of Natural Sciences of Philadelphia

---

INTRODUCTION

This work represents the seventh part of my study of the United States Bureau of Fisheries steamer Albatross collections. It concludes the second part of the more truly soft rayed fishes. Most of the localities relate to the Philippines. Especially is this true of the deep sea forms, most all of which were dredged in Philippine seas. Of the shore forms other localities pertain to the Netherlands Indies, China, Formosa, Riu Kiu and Oceania as all these places were visited by the Albatross. The introductory remarks, as to the organization and personnel of the scientific staff, as given in the other volumes, apply equally well to the present one.

As deep sea fishes are rare, if not represented, in most museums, I have brought together most of the known references and their descriptions. With respect to the apodal fishes or eels, which are largely shore forms, (only the known forms from the Indo Pacific are listed. Deep water fishes of the Alepocephalidae, Argentinidae and Serpidae, isospondylous fishes

of primitive organization are also included. I have also included the materials in the general series of fishes in the United States National Museum besides the type specimens. Likewise materials in the Academy of Natural Sciences of Philadelphia have been studied and noted or listed with their respective species.

The following are the new items pertaining to this work:

In Alepocephalidae:

<u>Whitleyidea</u> , new subgenus	<u>Alepocephalus</u> .
<u>Alepocephalus andersoni</u> , new species.	
<u>Halisauriceps</u> , new genus.	
<u>Megalepocephalus</u> , new subgenus	<u>Asquamiceps</u> .
<u>Asquamiceps longmani</u> , new species.	
<u>Bathytroctes welshi</u> , new species.	
<u>Bathytroctes hataii</u> , new species.	
<u>Bathytroctes zugmayeri</u> , new species.	
<u>Bathytroctes harperi</u> , new species.	
<u>Nemabathytroctes</u> , new subgenus.	<u>Bathytroctes</u> .
<u>Narcetes pappenheimi</u> , new species.	
<u>Narcetes lloydi</u> , new species.	
<u>Alcockella</u> , new subgenus.	<u>Narcetes</u> .
<u>Narcetes garmani</u> , new species.	
<u>Bathypropteron</u> , new subgenus.	<u>Rouleina</u> .

In Serpidae:

<u>Euproserpe</u> , new subgenus.	<u>Serpe</u> .
<u>Serpe schmidti</u> , new species.	



## In Gonostomatidae:

Pseudomaurolicus, new genus.Pseudomaurolicus megalops, new species.Athergonostoma, new genus.Athergonostoma philippinus, new species.

## In Sternoptychidae:

Acanthopoly<sup>i</sup>pnus, new subgenus.Polyipnus.Polyipnus fraseri, new species.

## In Stomiidae:

Elapterostomias, new genus.Elapterostomias philippinus, new species.Microdontostomias, new genus.Microdontostomias orientalis, new species.Pseudoeustomias, new genus.Pseudoeustomias myersi, new species.Melanostomias philippinus, new species.Melanostomias globulifer, new species.Melanostomias vierecki, new species.

## In Derichthyidae:

Benthenchelys, new genus.Benthenchelys cartieri, new species

## In Leptocephalidae:

Arisoma brachyrhynchus, new species.Microcephalocongrus, new subgenusBathycongrus.Bathycongrus megalops, new speciesBathycongrus stimpsoni, new species.

Bathycongrus bleekeri, new species.

Congrhynchus, new genus.

Congrhynchus talabonoides, new species.

Bathyuroconger, new subgenus Uroconger.

Uranoconger, new genus.

Uranoconger dentatus, new species.

Silvesterina, new genus.

Silvesterina parvibranchialis, new species.

\* Macrocephenchelyidae, new family .

\* Macrocephenchelys, new genus.

\* Macrocephenchelys pectoralis, new species.

In Echelidae:

Muraenichthys retropinna, new species.

Muraenichthys elerae, new species.

In Ophichthyidae:

Ophichthus paracephalozona, new species.

In Ratabouridae:

Rataboura oculis, new species.

In Notacanthidae:

Gnathonotacanthus, new subgenus Polynotacanthus.

Polynotacanthus vaillanti, new species.

Notacanthus abbotti, new species.

In Halosauridae:

Halosauropsis ridgewayi, new species.

In Synodontidae:

Peltaharpadon, new subgenus Harpadon.

## In Sudidae:

Paralepis philippinus, new species.

## In Myctophidae:

Serpe hoffmani, new species.

Lampanyctus blacki, new species.

Lampanyctus turneri, new species.

Lampanyctus bensoni, new species.

Diaphus gudgeri, new species.

Diaphus faustinoi, new species.

Diaphus harveyi, new species.

Diaphus boringi, new species.

Diaphus longleyi, new species.

Diaphus monodi, new species.

Diaphus parri, new species.

Diaphus ehrhorni, new species.

## In Evermannellidae:

Odontostomops, new subgenus.

Evermannella.

## Family ALEPOCEPHALIDAE

Body elongated, compressed. Mouth moderate or large, upper edge composed of maxillaries and premaxillaries, latter placed along front and lower edge of former. Maxillary with posterior supplemental bone. Barbels none. Teeth feeble, on premaxillaries and mostly on palatines. Nostrils close to eye. Opercles complete, very thin. Gill opening very wide, partly covered by continuation of skin of head and by gill membranes, which free from isthmus and overlapping each other. Gill rakers long, numerous. Pseudo-branchiae present. Head mostly naked. Scales thin, cycloid, at least in lateral line. No adipose dorsal. Anal more or less below dorsal. Pectoral rather high. Ventral nearly median, sometimes absent. Vent behind middle of body.

Deep sea fishes of similiar fundamental structure to the Clupeidae and Salmonidae, but without the postclavicle or an adipose fin, and both dorsal and anal posterior or opposed. The skeleton is feebly ossified and the air bladder absent.

There is less uncertainty regarding the habitat of this family than in respect to that of some of the others. Structure, blackness of integument, food, and the condition of the specimens on arrival at the surface all favor the conclusion that these fishes dwell close to the bottom, hundreds of fathoms below the surface. The large eye is a distinguishing feature of the Alepocephalidae and its possession must be regarded as proof of the presence of light either in the bodies of the other inhabitants of the sea bottom, fellows, enemies, prey, etc., or in the medium in which the family lives, one or the other or both. In the absence of luminous organs, except, it may

be in *Xenodermichthys*, the principal dependence for recognition of others of the same species at a distance, probably lies in ability to recognize similarities and differences in form, outlines, positions of fins, and the like, and these are made visible by the luminosity of the integuments of the object or by the light in the water around it, presumptively by both of them. The surfaces of these fishes are more or less phosphorescent, but aside from this it would appear that the large eye, with the lack of special light organs and of special developments of the organs of touch, should be taken as evidence that the Alepocephalidae, and similar fishes, dwell in water that is lighted, perhaps by chemical changes taking place in the ooze on the ocean floor, changes that may at once cause the phosphorescence, retard the waste of tissues, and possibly add something to the supply of oxygen. (Garman.)

Esunculus Kaup, called by Jordan "a larva, allied to ALEPOCEPHALUS" surely approaches the early larval stage of Albula.

Tauredophidium Alcock, placed with this family by Jordan, seems more correctly related to the ophidiids, with which it was associated by its describer.

## ANALYSIS OF GENERA.

- a.<sup>1</sup> Ventral origin median in body without caudal, or nearly so.
- b.<sup>2</sup> ALEPOCEPHALINAE. Snout short or moderate.
- c.<sup>1</sup> Body covered with scales.
- d.<sup>1</sup> Ventrals present.
- e.<sup>1</sup> Maxillaries toothless; branchiostegals usually 6.
- f.<sup>1</sup> Head moderate, 3 or more in body without caudal.
- g.<sup>1</sup> Premaxillaries not greatly expanded or ensheathing mandible; dorsal and anal opposed.
- h.<sup>1</sup> Jaws even, or nearly so. ALEPOCEPHALUS.
- h.<sup>2</sup> Snout well protruded in slender point before mandible.
- HALISAURICEPS.
- g.<sup>2</sup> Premaxillaries greatly expanded, ensheathed mandible.
- i.<sup>1</sup> Maxillary not extending behind eye; dorsal origin behind anal origin. XENOGNATHUS.
- i.<sup>2</sup> Maxillary extends well beyond eye; dorsal advanced from anal. LEPTOCHILICHTHYS.
- f.<sup>2</sup> Head very large, long as rest of body without caudal. ASQUAMICEPS.
- e.<sup>2</sup> Maxillaries with teeth; branchiostegals 7.
- j.<sup>1</sup> Body elongate.
- k.<sup>1</sup> Upper teeth uniserial. BATHYTROCTES.
- k.<sup>2</sup> Several series of teeth on premaxillaries, maxillary teeth uniserial NARCETES.

- 2
- j. Body short and deep; teeth uniserial PLATYTROCTEGEN
- 2
- d. Ventrals absent; body short and deep; branchiostegals 6.
- PLATYTROCTES
- 2
- c. Body scaleless, though sometimes small nodules present.
- 1.
1. Maxillary not extended beyond eye; no median cutaneous fold on predorsal.
- 1
- m. Dorsal and anal subequal, well separated from well developed caudal; eyes moderate.
- 1
- n. D.15 to 21; A.14 to 19. ROULEINA.
- 2
- n. D.25 to 30; A.28 to 34. XENODERMICHTHYS.
- 2
- m. Dorsal much shorter than anal, which more than half the length of fish; caudal peduncle and caudal fin very small; eyes large; LEPTODERMA.
- 2
1. Maxillary reaches well beyond eye; high median cutaneous predorsal fold ANOMALOPTERUS.
- 2
- b. AULASTOMATOMORPHINAE. Snout long, tube-like, with small terminal mouth; scales minute, scarcely imbricate AULASTOMATOMORPHA.
- 2
- a. DOLICOPTERYGINAE. Ventral origin well postmedian; eyes telescopic; pectoral very long. DOLICOPTERYX.

Genus ALEPOCEPHALUS Risso

Alepocephalus RISSO, Mém. Acad. Royale de Turin, vol.25, 1820, p.270.

Type Alepocephalus rostratus RISSO, monotypic.

Conocara GOODE and BEAN, Oceanic Ichth., 1895, p.39. Type Conocara mcdonaldi

Goode and Bean, designated by JORDAN, Genera of Fishes, pt.4, 1920,

p.467.

Mitchillina JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47, pt.1, 1896,

p.453. Type Alepocephalus bairdii GOODE and BEAN, monotypic.

Benthosphyraena COCKERELL, Bull. U.S. Geolog. Surv., 1918 (1919), p. 172.

Type Alepocephalus macropterus Vaillant.

Ericara GILL and TOWNSEND, Proc. Biol. Soc. Washington, vol.11, Sep.17, 1897,

p.232. Type Ericara salmonea GILL and TOWNSEND, monotypic.

Body moderately elongate, compressed, with moderate or short caudal peduncle. Head moderate,  $2\frac{3}{4}$  to 4. Snout moderate. Eye large. Jaws nearly even in front. Series of small teeth on premaxillaries, mandibles and palatines and sometimes on vomer. Opercles large, thin. Gill openings wide, covered partly by entirely separate and overlapping gill membranes and by continuation of skin of head. Gill rakers numerous, close set, rather long. Pseudobranchiae present. Branchiostegals 6. Head naked. Scales fine to large, cycloid, deciduous. Fin bases scaly. Lateral line complete, scales tubular. Dorsal and anal posterior, opposite or nearly so. Caudal forked. Paired fins well developed, rather small.

Bathypelagic, mostly in tropical seas. Following Norman with the inclusion of Conocara, Mitchillina and Benthosphyraena, a very wide range of variation in squamation is found in the present assemblage. It also follows Ericara, based on a large unique example and without any very definite external characters, should also be admitted.

#### ANALYSIS OF SPECIES

- 1
  - a. ALEPOCEPHALUS. Scales moderately small, 50 to 58 in lateral line.
  - 2
    - b. Maxillary reaches within eye but not to eye center.



- 1  
c. A. 22 or 23.
- 1  
d. D.15 to 18; orbit  $3 \frac{1}{4}$  to  $3 \frac{1}{2}$  in head rostratus.
- 2  
d. D.20; orbit  $3 \frac{3}{4}$  to  $3 \frac{4}{5}$  in head giardi.
- 2  
c. A. 17; D. 16; orbit  $3 \frac{1}{4}$  to  $3 \frac{4}{5}$  in head andersoni.
- b. Maxillary reaches at least to eye center or slightly beyond.
- 1  
e. D.16 or 17; A. 17 to 19; eye 6 asperifrons.
- 2  
e. D.17; A.20; eye  $3 \frac{2}{5}$  macrops.
- 3  
e. D. 18; A.18; eye  $3 \frac{1}{2}$  barnardi.
- 4  
e. D. 29; A.35; eye  $5 \frac{1}{10}$  edentulus.
- 2  
a. MITCHILLINA. Scales small, 60 to 75 in lateral line; maxillary reaches eye or to its center.
- 1  
f. D. 16 or 17; A. 17.
- 1  
g. Maxillary  $\frac{1}{5}$  in eye blanfordi.
- 2  
g. Maxillary  $\frac{1}{3}$  in eye productus.
- 3  
g. Maxillary  $\frac{1}{2}$  in eye umbriceps.
- 2  
f. D. 20 to 22; A.25 to 27.
- 1  
h. Maxillary  $\frac{1}{8}$  to  $\frac{1}{4}$  in eye; lower gill rakers 15 bicolor.
- 2  
h. Maxillary  $\frac{1}{2}$  in eye; lower gill rakers 22 bairdii.
- 3  
a. ERICARA. Scales smaller, 80 to 110 in lateral line.
- 1  
i. Scales 80 to 90.
- 1  
j. Maxillary  $\frac{2}{3}$  to  $\frac{3}{4}$  in eye; D. 17 to 19; eye 5 to 6 in head agassizii.
- 2  
j. Maxillary reaches eye;

- <sup>1</sup>  
k. D.16 to 18; A. 17 to 19; eye 4 1/2 to 5 1/2 in head.
- <sup>1</sup>  
h. Pectoral longer than snout.
- <sup>1</sup>  
m. Dorsal origin slightly before anal origin tenebrosus.
- <sup>2</sup>  
m. Dorsal origin opposite anal origin convexifrons.
- <sup>2</sup>  
l. Pectoral less than snout; dorsal origin slightly before anal origin. fundulus.
- <sup>2</sup>  
k. D.24; A.31 to 35; eye 5 1/8 to 6 1/2 in head microlepis.
- <sup>2</sup>  
i. Scales 108; D.17; A.24; eye 7 in head salmoneus.
- <sup>4</sup>  
a. WHITLEY IDEA new subgenus. Scales very small, 140 in lateral line; D. 21, inserted behind anal origin; A.27; maxillary reaches eye niger.
- <sup>5</sup>  
a. CONOCARA. Scales minute, 190 to 216 in lateral line; D.20, inserted well behind anal origin; A.36 or 37.
- <sup>1</sup>  
m. Lower gill rakers 17 macropterus.
- <sup>2</sup>  
m. Lower gill rakers 14 mcdonaldi.

Subgenus ALEPOCEPHALUS Risso

Alepocephalus rostratus Risso.

Alepocephalus rostratus RISSO, Mem. Acad. Sci. Torino, vol. 25, 1820, p. 291, pl.10, fig. 4. Nice; Hist. Nat. Eur. Mérid., vol. 3, 1826, p. 449, pl. 11, fig. 28. (Nice). - SWAINSON, Nat. Hist. Animals, vol. 2, 1839, p. 298 (reference). - VALENCIENNES, Hist. Nat. Poiss., vol. 19, 1846, p. 172, pl.566 (Nice). - JOHNSON, Ann. Mag. Nat. Hist., London,

ser. 3, vol. 10, 1862, p. 285 ( Madeira). - GUNTHER, Cat. Fishes Brit. Mus., vol. 7, 1868, p. 477 ( no locality). - MOREAU, Hist. nat. poiss. France, vol. 3, 1881, p. 463. - GIGLIOLI, Elenco cat. pesci italiani, 1880, p. 106. - GUNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 223 ( Mediterranean ). - VAILLANT, Expéd. Sci. Travailleur et Talisman, Poiss., 1888, p. 148, pl. 11, figs. 1, a - d, pl. 12, fig. 5 (coast of Morocco, 834 to 2190 meters; Canaries, 975 meters; coasts of Soudan, 830 to 932 meters; Banc d'Arguin, 1113 to 2330 meters; Cape Verde, 3655 meters; Azores, 2235 meters ). - GOODE and BEAN, Oceanic Ichth., 1895, p. 36, pl. 12, fig. 41 (compiled ).

Bathytroctes attritus VAILLANT, Expéd. Sci. Travailleur et Talisman, Poiss., 1888, p. 158, pl. 12, figs. 2, a - c (structure). Banc d'Arguin, 1550 meters; Cape Verde, 3655 meters; Azores, 1442 meters. - GOODE and BEAN, Oceanic Ichth., 1895, p. 45 (reference ). VAILLANT, Rés. Camp. Sci. Monaco, vol. 52, 1919, p. 129, (N.  $37^{\circ} 28' 30''$  W.  $25^{\circ} 31' 45''$ , 1732 meters. southeast of Azores ).

Depth  $5 \frac{1}{5}$  to  $5 \frac{2}{3}$ ; head 3 to  $3 \frac{1}{6}$ , width  $2 \frac{2}{3}$  to  $2 \frac{7}{8}$ . Snout  $4 \frac{2}{5}$  to  $4 \frac{1}{2}$  in head as measured from eye; orbit  $3 \frac{1}{4}$  to  $3 \frac{1}{2}$ ; eye  $3 \frac{3}{4}$  to  $4 \frac{2}{3}$ , equals snout, greater than interorbital; maxillary reaches  $\frac{1}{3}$  to  $\frac{2}{5}$  in eye, expansion 2 to  $2 \frac{3}{4}$  in eye, length 3 in head; interorbital 6 to  $7 \frac{2}{5}$ , low, broadly concave. Gill rakers 8 + 19, lanceolate,  $2 \frac{2}{5}$  in eye; gill filaments  $\frac{3}{5}$  gill rakers.

Scales 52 in lateral line to caudal base; 7 above, 10 below, 40 predorsal. Bases of vertical fins scaly. Scales finely adherent, in even

longitudinal series, smaller on fin bases. Scales with 17 or 18 weak radiating basal striae; circuli very fine, largely longitudinal and parallel.

D. V, 10, I to V, 13, I, third branched ray  $2 \frac{7}{8}$  to  $3 \frac{3}{5}$  in head; A. V, 17, I, third branched ray  $2 \frac{7}{8}$  (?), to 3 (?); caudal  $1 \frac{3}{4}$  to 2 (?) well forked, about 10 inconspicuous rudimentary rays above or below; least depth of caudal peduncle 4 to  $4 \frac{1}{4}$ ; pectoral  $2 \frac{1}{4}$  to  $2 \frac{2}{3}$ ; ventral 3 to  $3 \frac{2}{5}$ .

Head deep neutral black. Iris dark gray, pupil brownish white. Inside mouth and gill opening black. Body dark livid gray or neutral gray, each of scale exposures narrowly much darker to neutral dusky. Fins blackish brown. Where scales have fallen skin dark brown.

Eastern Atlantic and Mediterranean.

40048 U.S.N.M. Nice. Royal Zoological Museum Florence. Length 295 mm.

49332 U.S.N.M. Nice. Dr. C. Bellotti. Length 347 mm.

Alepocephalus giardi Koehler.

*Alepocephalus giardi* KOEHLER, Ann. Univ. Lyon, vol. 26, 1896, p. 513, pl. 26, fig. 1, N.  $45^{\circ} 57'$  W.  $6^{\circ} 21'$ , 1410 meters; N.  $44^{\circ} 39'$  W.  $4^{\circ} 39'$ , 800 meters, Gulf of Gascony. - MURRAY and HJORT, Depths of the Ocean, 1912, p. 394, fig. 262 (Faroe-Shetland Channel; Faroe Bank, 750 to 840 meters).

Depth  $4 \frac{4}{5}$ ; head 3. Snout  $4 \frac{1}{6}$  in head; eye  $3 \frac{3}{4}$ , slightly greater than snout, less than interorbital; maxillary reaches  $\frac{3}{7}$  in eye, expansion

$2 \frac{7}{8}$  in eye, length 3 in head; lower jaw shorter than upper; interorbital low.

Along lateral line 54 muscular impressions to caudal base; 9 above, 6 below. Scales not described.

D. 20. fin height  $4 \frac{7}{8}$  in head, origin slightly behind anal origin; A. 23, fin height  $4 \frac{2}{3}$ ; caudal  $2 \frac{1}{8}$ , emarginate, lobes rounded and 15 rudimentary rays extend well forward; least depth of caudal peduncle  $4 \frac{1}{4}$ ; pectoral  $2 \frac{1}{10}$ , reaches ventral base; ventral  $3 \frac{2}{5}$ .

Grayish. Head below, mouth, gill membranes and gill opening blackish. Length 320 mm. (Koehler).

Atlantic Ocean.

Alepocephalus asperifrons Garman.

Alepocephalus asperifrons GARMAN, Mem. Mus. Comp. Zool., vol. 24, 1899, p.291, pl.59, fig.1, N.  $6^{\circ} 35'$  W.  $81^{\circ} 44'$ , 782 fathoms; N.  $7^{\circ} 15'$  W.  $79^{\circ} 36'$ , 1020 fathoms, Gulf of Panama.

Depth 5; head  $2 \frac{4}{5}$ . Snout to eye  $3 \frac{2}{5}$  in head; orbit  $4 \frac{1}{3}$ ; eye 6,  $1 \frac{3}{4}$  in snout; maxillary reaches  $\frac{3}{5}$  in eye, expansion  $1 \frac{2}{3}$  in eye, length  $2 \frac{3}{5}$  in head; teeth small, slender, acicular, uniserial on premaxillaries, [dentaries and palatines; interorbital concave.

Scales 56 to 58 in lateral line; 6 above, 7 below.

D. 16 or 17, fin base  $2 \frac{7}{8}$  in head, origin opposite anal origin; A. 17 to 19, fin base  $2 \frac{2}{5}$ ; caudal damaged, evidently deeply emarginate; least depth of caudal peduncle  $4 \frac{3}{4}$ ; paired fins damaged, evidently small.

Surface and internal linings deep black. Length 305 mm. (Garman.)

Gulf of Panama.

Alepocephalus macrops Lloyd.

Alepocephalus macrops LLOYD, Mem. Indian Mus., vol. 2, No.3, Aug. 1909, p.148,  
pl.44, fig.3. Bay of Bengal off Arakan coast, 419 fathoms.

Depth  $4 \frac{4}{5}$ ; head  $2 \frac{3}{5}$ . Snout  $3 \frac{1}{2}$  in head from snout tip; eye  $3 \frac{2}{5}$ , greater than snout; maxillary reaches  $\frac{1}{3}$  in eye, expansion 3 in eye, length  $2 \frac{4}{5}$  in head; teeth conspicuous, on premaxillaries, dentaries, palatines and vomer; interorbital very low. Gill rakers numerous, long, lanceolate.

Scales 50 in lateral line; 8 above, 8 below.

D. 17, inserted very slightly before anal, fin base  $2 \frac{2}{3}$  in head; A. 20, fin base  $2 \frac{2}{5}$ ; least depth of caudal peduncle  $5 \frac{1}{2}$ ; pectoral 8 (?); ventral 6 (?).

Head jet black. Body brownish black. Fins black, with bluish tinge. Length 110 mm. (Lloyd.)

Indian Ocean.

Alepocephalus barnardi Norman

Alepocephalus barnardi NORMAN, Discovery Rep., vol.2, 1930, p.270. Off Cape Point, South Africa, 700 fathoms.

Bathytroctes rostratus (not GUNTHER) BARNARD, Ann. South African Mus., vol. 21, pt. 1, June 1925, p.122 (Cape Point example).

Depth 6; head 3. Snout  $3 \frac{1}{2}$  in head; eye  $3 \frac{1}{2}$ ; maxillary reaches nearly half way in eye; lower jaw included in upper.

Scales 50 (?) in lateral line.

D. 18; A. 18, origin below fifth dorsal ray, more than twice as distant from snout end as from caudal base; caudal peduncle nearly 3 times long as

deep. Length 200 mm. (Norman).

Off Cape Point, South Africa, in 700 fathoms. Said to differ from Alepocephalus productus Goode and Bean in its narrow body, longer snout, larger orbit and longer caudal peduncle. From Alepocephalus unbriceps Jordan and Thompson differs in longer snout and larger eye.

Alepocephalus edentulus Alcock

Alepocephalus edentulus ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.10, 1892, p.358, pl. 18, fig.2, Bay of Bengal (N. Lat.  $12^{\circ} 50'$  E. Long.  $81^{\circ} 30'$ ), in 475 fathoms. - GOODE and BEAN, Oceanic Ichth., 1895, pp. 36, 510 (reference). - ALCOCK, Journ. Asiatic Soc. Bengal, vol. 65, pt. 2, 1896, p.334 ( off Madras coast, 475 fathoms); Cat. Deep Sea Fishes Indian Mus., 1899, p. 172 (off Madras coast, 475 fathoms; Bay of Bengal, 475 fathoms); Illustrat. Zool. Investigator, Fishes, pt. 7, 1900, pl. 33, fig.4

Depth  $4 \frac{3}{5}$ ; head  $3 \frac{2}{5}$ . Snout  $4 \frac{1}{3}$  in head; eye  $5 \frac{1}{10}$ ,  $1 \frac{1}{8}$  in snout; maxillary reaches  $\frac{3}{5}$  in eye, expansion  $2 \frac{3}{4}$  in eye, length  $2 \frac{7}{8}$  in head; interorbital convex. Gill rakers  $\pm 12$ , slender, lanceolate.

Scales 50 in lateral line; 15 transversely. Scales very caducous.

D. 29, origin over first fourth in anal base, fin height  $4 \frac{2}{5}$ ; caudal  $1 \frac{4}{5}$ , deeply forked; least depth of caudal peduncle  $6 \frac{1}{3}$ ; pectoral (?) ventral  $3 \frac{7}{8}$ .

Head and eyes jet black. Body and fins gray black. Length nearly 175 mm. (Alcock.)

Indian Ocean.

## Subgenus MITCHILLINA Jordan and Evermann

Alepocephalus blanfordi Alcock

Alepocephalus blanfordi ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.10, 1892, p.357. Gulf of Manaar (N. Lat.  $6^{\circ} 58'$  E. Long.  $77^{\circ} 26' 50''$ ), in 902 fathoms; Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.334 (compiled); Illustrat. Zool. Investigator, Fishes, pt.4, 1897, pl.9, fig.1; Cat. Deep Sea Fishes Indian Mus., 1899, p.171, (Arabian Sea, off Cape Comorin, 902 fathoms). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.10, Flores Sea, in 694 meters). - WEBER and BEAUFORT, Fishes Indo. Austral. Archipelago, vol.2, 1913, p.100 (Flores Sea). - NORMAN, Discovery Rep., vol.2, 1930, p.270 (type).

Alepocephalus blanfordii GOODE and BEAN, Oceanic Ichth., 1895, pp.36, 509 (reference).

Depth  $5 \frac{1}{2}$ ; head  $2 \frac{4}{5}$ . Snout  $3 \frac{1}{5}$  in head; eye 4,  $1 \frac{1}{5}$  in snout, not quite <sup>twice</sup> interorbital; mandible included in upper jaw; maxillary reaches  $\frac{1}{5}$  in eye, expansion  $3 \frac{1}{5}$  in eye, length  $2 \frac{7}{8}$  in head from snout tip; row of fine teeth in each jaw and on each prominent palatine; interorbital low. Gill rakers numerous, broadly lanceolate, acute.

Scales 65 in median lateral series to caudal base and 5 more on latter; 22 transversely. Scales deciduous, cycloid. Lateral line not evident.

D. 16, opposite anal; A.17; caudal forked; least depth of caudal peduncle  $4 \frac{2}{3}$ ; paired fins damaged (?)

Head and fins black. Body lavender gray. Length 357 mm. (Alcock.)

Indian Ocean.



Alepocephalus productus Gill

Alepocephalus productus GILL, Proc. U.S.Nat. Mus., vol.6, 1883 (1884), p.257.

N.  $39^{\circ} 26' 16''$  W.  $70^{\circ} 2' 37''$ , 1362 fathoms. - GÜNTHER, Rep. Voy. Challenger, vol.22, 1887, p.223 (compiled). - GOODE and BEAN, Oceanic Ichth., 1895, p.37, pl.13, fig.46 (type). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., no.47, pt.1, 1896, p.452 (compiled).

Depth  $4 \frac{3}{5}$ ; head  $2 \frac{3}{4}$ , width  $2 \frac{1}{2}$ . Snout 3 in head from eye to snout tip; orbit  $3 \frac{2}{3}$ ; eye 5,  $1 \frac{4}{5}$  in snout, greater than interorbital; maxillary reaches  $\frac{1}{3}$  in eye, expansion  $2 \frac{1}{4}$  in eye, length  $2 \frac{3}{5}$  in head; interorbital 8, bony, with moderately strong ridge over each eye, broadly concave above and broadening concavely to occiput; opercle smooth. Gill rakers 6 + 15, lanceolate, rather short,  $2 \frac{1}{2}$  in eye, subequal with gill filaments.

Scales 67 in lateral line to caudal base; 9 above, 11 below, 62 predorsal forward to occiput. Bases of dorsal, anal and caudal scaly. Scales with very fine parallel longitudinal striae, overset with ovoid whorl like annuli.

D. 17, rays broken, fin low, fin base  $2 \frac{1}{8}$  in head; A. 17, rays broken, fin low, fin base  $2 \frac{3}{5}$ ; caudal damaged, apparently emarginate, rudimentary rays about 10, small, inconspicuous; least depth of caudal peduncle  $4 \frac{1}{2}$ ; pectoral rather small, at least 3 in head; ventral  $4 \frac{1}{4}$  (?), origin about midway between caudal base and front eye edge.

Head black. Iris dark gray, pupil brownish white. Inside gill opening blue black. Inside mouth black. Body dark brown, scale pockets blackish brown. Fins all dusky.

Western Atlantic.

33341 U.S.N.M. N  $39^{\circ} 26' 16''$  W.  $70^{\circ} 2' 37''$  . In 1362 fathoms.

Albatross Station 2035. Length 460 (?) mm., caudal broken. Type.

Alepocephalus umbriceps Jordan and Thompson

Alepocephalus umbriceps JORDAN and THOMPSON, Mem. Carnegie Mus., vol.6, no.4,

Sep. 1914, p.209, pl.24, fig.1. Aomori, Japan.

Depth 5; head  $2 \frac{3}{4}$ . Snout 4 in head; eye  $4 \frac{3}{4}$ ,  $1 \frac{1}{8}$  in snout; maxillary reaches  $\frac{1}{2}$  in eye, expansion  $2 \frac{1}{8}$  in eye, length  $2 \frac{2}{3}$  in head; interorbital  $6 \frac{1}{2}$ , broad. Gill rakers 7 + 19, longest  $\frac{1}{3}$  of eye.

Scales 65 pores in lateral line. Vertical fins with scaly bases. Scales very caducous, most all fallen.

D. 17, fin height  $3 \frac{1}{5}$  in head; A. 17, fin height 3; caudal  $1 \frac{3}{5}$ , deeply forked; least depth  $4 \frac{3}{4}$ ; pectoral  $2 \frac{3}{4}$ ; ventral 3.

Head deep black, each scale on body tipped with black. Fins black. Mouth cavity and peritoneum black. Length 270 mm. (Jordan and Thompson.)

Off Japan.

Alepocephalus bicolor Alcock

Alepocephalus bicolor ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.8, 1891,

p.133. Bengal Bay (N.Lat.  $15^{\circ} 56' 50''$  E.Long.  $81^{\circ} 30' \frac{1}{2}$  '), in 240 to 276 fathoms; Illustrat. Zool. Investigator, Fishes, pt.1, 1892, pl.4, fig.2, - GOODE and BEAN, Oceanic Ichth., 1895, pp.36, 509 (reference). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.334 (off Madras coast, 240 to 276 fathoms); Cat. Deep Sea Fishes Indian Mus., 1899, p.169, (Bay of Bengal, off Ganjam coast, 240 to 276 fathoms; Arabian Sea, off Malabar coast, 360 fathoms). - BRAUER, Deutsch. Tiefsee Exp. Valdivia, vol. 15, Tiefsee Fische,

1906, p.19 (off Sumatra). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.10, (Flores Sea, 521 to 538 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.99, fig.34, (Flores Sea).

Depth  $5 \frac{3}{4}$  to  $6 \frac{1}{2}$ ; head  $3 \frac{1}{3}$  to  $3 \frac{2}{5}$ , width  $2 \frac{3}{4}$  to 3. Snout  $3 \frac{1}{3}$  to  $3 \frac{1}{2}$  in head; orbit  $3 \frac{3}{5}$  to  $4 \frac{1}{8}$ ; eye  $4 \frac{4}{5}$  to 6,  $1 \frac{1}{2}$  to  $\frac{1}{4}$  in snout,  $1 \frac{1}{8}$  to  $1 \frac{4}{5}$  in interorbital; maxillary reaches  $\frac{1}{8}$  to  $\frac{1}{4}$  in eye, expansion  $1 \frac{3}{4}$  to  $2 \frac{1}{8}$  in eye, length  $2 \frac{4}{5}$  to 3 in head; interorbital  $3 \frac{2}{5}$  to 5, nearly level or only very slightly convex; opercle with 6 or 7 radiating striae. Gill rakers 10 + 15, lanceolate,  $1 \frac{1}{4}$  in eye; gill filaments  $\frac{2}{3}$  gill rakers.

Scales 62 to 65 in lateral line to caudal base; 7 above, 7 below, 32 or 33 predorsal forward to occiput. Small scales on bases of all fins. Scales with 17 to 19 fine long basal radiating striae; circuli very fine.

D. VIII, 12, I or VIII, 13, I, fin height 3 to 4 in head; A.V, 22, I, fin height  $3 \frac{1}{4}$  to  $4 \frac{2}{3}$ , fin origin apposite or slightly behind dorsal origin; caudal  $1 \frac{2}{5}$  to  $1 \frac{1}{3}$ , deeply forked, rudimentary rays above or below 11 to 17; least depth of caudal peduncle  $3 \frac{3}{5}$  to  $4 \frac{1}{3}$ ; pectoral  $1 \frac{1}{4}$  to  $2 \frac{1}{2}$ , in large example reach middle of ventral; ventral 2 to  $2 \frac{1}{2}$ , reach  $\frac{4}{5}$  to vent; vent about opposite dorsal origin.

Head like lamp black. Iris black, pupil ivory white. Body dusky brown. Fins brownish. Inside mouth and gill opening blackish.

Indian and Pacific Oceans.

Although Weber and Beaufort give their dimensions as 300 mm. all my specimens are smaller. Neither these writers, or Alcock, show the long

pectoral, which even in small specimens usually reaches beyond the ventral origin. In all my examples the mandible is shorter than the upper jaw.

4041. D. 5511. Camp Overton Light, S.  $80^{\circ}$  E., 15.3 miles ( $8^{\circ} 15' 20''$  E.  $123^{\circ} 57'$ ), northern Mindanao and vicinity. In 410 fathoms. August 7, 1909. Length 233 mm.

4001. D. 5365. Cape Santiago Light, N.  $73^{\circ}$  W., 6.7 miles (N.  $13^{\circ} 44' 24''$  E.  $120^{\circ} 45' 30''$ ), Balayan Bay, Luzon. In 214 fathoms. February 22, 1909. Length 168 mm.

4750. D. 5122. Malabrigo Light, N.  $46^{\circ}$  W., 20.60 miles (N.  $13^{\circ} 21' 30''$  E.  $120^{\circ} 30' 33''$ ), east coast of Mindoro. In 220 fathoms. February 2, 1908. Length 245 mm.

2570. D. 5378. Mompog Island (E.), N.  $38^{\circ}$  W., 17 miles (N.  $13^{\circ} 17' 45''$  E.  $122^{\circ} 22'$ ), Marinduque Island and vicinity. In 395 fathoms, March 4, 1909. Length 170 mm.

4035. D. 5586. Sipadan Island. (M.) West, 9.4 miles (N.  $4^{\circ} 6' 50''$  E.  $118^{\circ} 47' 20''$ ), Sibuko Bay, Borneo and vicinity. In 347 fathoms. September 28, 1909. Length 245 mm (?).

4523 to 4525. D. 5111. Sombrero Island, S.  $41^{\circ}$  E., 4.50 miles (N.  $13^{\circ} 45' 15''$  E.  $120^{\circ} 46' 30''$ ), China Sea off southern Luzon. In 236 fathoms. January 16, 1908. Length 135 to 153 mm.

3 examples.

Alepocephalus bairdii Goode and Bean

Alepocephalus bairdii GOODE and BEAN, Proc. U.S. Nat. Mus., vol. 2, 1879 (1880),

p.55. Grand Banks, 200 fathoms. - p.55. Grand Banks, 200 fathoms. -  
 JORDAN and GILBERT, Bull. U.S. Nat. Mus., No. 16, 1882, p. 257,  
 (compiled). - GÜNTHER, Rep. Voy. Challenger, vol. 22, 1887, p. 224  
 (compiled). - GOODE and BEAN, Oceanic Ichthy., 1895, p. 38, pl. 13,  
 fig. 47, (type). Mit

Mitchillina bairdii JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No. 47, pt. 1,  
 1896, 454 (compiled).

Depth  $7 \frac{2}{3}$ ; head 4, width  $2 \frac{7}{8}$ . Snout  $4 \frac{1}{3}$  in head from snout tip  
 to front eye edge; orbit  $4 \frac{1}{4}$ , eye  $5 \frac{1}{5}$ ,  $1 \frac{1}{8}$  in snout, greater than in-  
 terorbital; maxillary reaches  $\frac{1}{2}$  in eye, length 3 in head; interorbital  
 7, with elevated median convex ridge to occiput. Gill rakers  $10 + 22$ ,  
 lanceolate,  $1 \frac{1}{4}$  in eye; gill filaments  $3 \frac{1}{5}$  in gill rakers.

Scales 68 in lateral line to caudal base; 7 above, 11 below, 48  
 predorsal. Dorsal, anal and caudal bases finely scaly. Scales thin, flat,  
 cycloid, well imbedded, with many as 17 weak radiating basal striae.  
 Circuli largely longitudinal, parallel, very fine, numerous.

D. 22, I (rays damaged), fin height equals orbit; A. 25, I (rays  
 broken), fin height slightly greater than orbit, fin origin about opposite  
 first fourth of dorsal base and fin base extends behind dorsal base for  
 space equals  $3 \frac{2}{3}$  in dorsal fin base; caudal small, forked, lobes rounded,  
 rudimentary rays about 10. little evident, fin  $2 \frac{1}{4}$  in head; least depth  
 of caudal peduncle  $3 \frac{2}{5}$ ; pectoral  $3 \frac{1}{5}$ ; ventral (damaged) about equals  
 orbit.

Uniform brownish in alcohol, due to most of skin rubbed off. Head  
 where skin remains blackish. Iris slaty, pupil brown. Inside gill

openings livid gray blue. Fins all dusky.

22468 U.S.N.M. Gloucester Donation No. 305. Christian Johnson. Schooner "William Thompson", In 200 fathoms. Figured by Goode and Bean.

38251 U.S.N.M. Grand Banks. November 1886. A Johnson. Length 947 mm. Evidently type.

Subgenus ERICARA Gill and Townsend.

Alepocephalus agassizii Goode and Bean,  
Alepocephalus agassizii GOODE and BEAN, Bull. Mus. Comp. Zool., vol.10, 1882, p.218, N.  $38^{\circ} 18' 40''$  W.  $73^{\circ} 18' 10''$ , 922 fathoms. - GUNTHER, Rep. Voy. Challenger, vol.22, 1887, p.223 (Compiled). - GOODE and BEAN, Oceanic Ichth., 1895, p.37, pl.13, fig.45 (N.  $15^{\circ}$  to  $41^{\circ}$  W.  $63^{\circ}$  to  $74^{\circ}$ , 538 to 1106 fathoms). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47, pt.1, 1896, p.453 (compiled).

Depth  $4 \frac{3}{5}$  to  $6 \frac{1}{4}$ ; head  $2 \frac{3}{4}$  to  $2 \frac{7}{8}$ , width  $2 \frac{3}{5}$  to  $2 \frac{7}{8}$ .

Snout  $3 \frac{1}{3}$  to 4 in head; orbit 4 to  $4 \frac{1}{2}$ , eye 5 to 6,  $1 \frac{1}{5}$  to  $1 \frac{3}{5}$  in snout, subequal to equal to interorbital; maxillary reaches  $\frac{2}{3}$  to  $\frac{3}{4}$  in eye, expansion  $1 \frac{1}{2}$  to  $2 \frac{3}{4}$  in eye, length  $2 \frac{1}{2}$  to  $2 \frac{3}{5}$  in head; interorbital  $5 \frac{1}{6}$  to  $6 \frac{1}{5}$ , nearly level or with broad low ridge over each eye between which broad groove gradually broader and deeper to occiput. Gill rakers  $9 \pm 19$ , lanceolate,  $1 \frac{7}{8}$  in eye; gill filaments  $\frac{3}{4}$  gill rakers.

Scales 88 to 90 in lateral line to caudal base; 14 above, 14 or 15 below, about 70 predorsal. Scales present on bases of vertical fins. Scales this, elongate, deeply imbedded. Scales with circuli fine, numerous, mostly

longitudinal parallel striae.

D. 15 (rays usually broken), fin base  $2 \frac{1}{3}$  to  $2 \frac{7}{8}$  in head; A. 17 to 19 (rays mostly broken), origin little behind dorsal origin, fin base 2 to  $2 \frac{3}{4}$  in head; caudal (damaged) forked, at least more than half of head length; least depth of caudal peduncle 4 to 5; pectoral  $3 \frac{1}{4}$  to  $3 \frac{1}{2}$ , (usually broken); ventral 4 to  $4 \frac{1}{2}$  (usually broken), fin origin midway between front of orbit and caudal base.

Head black. Iris slate black, pupil pale brown. Inside mouth and gill opening livid purplish or plain black. Body brown, scale pockets all dusky to blackish. Fins dusky brown.

Western Atlantic.

2550 D. 5121. Malabrigo Light, N.  $14^{\circ}$  W., 9 miles (N.  $13^{\circ}$   $27' 20''$  E.  $121^{\circ}$   $17' 45''$ ), east coast of Mindoro. In 108 fathoms. February 2, 1908. Length 443 mm.

33056 U.S.N.M. N.  $39^{\circ}$   $29' 45''$  W.  $71^{\circ}$   $43'$ . May 1883.

Albatross Station (2030). Length 440 mm. (?)

33058 U.S.N.M. N.  $39^{\circ}$   $29' 45''$  W.  $71^{\circ}$   $43''$ . May 1883.

Albatross Station (2030). Length 410 mm. (?)

33059 U.S.N.M. N.  $39^{\circ}$   $29' 45''$  W.  $71^{\circ}$   $43''$ . May 1883.

Albatross Station (2030). Length 470 mm.

33325 U.S.N.M. N.  $39^{\circ}$   $41'$  W.  $69^{\circ}$   $20' 20''$ . In 1106 fathoms.

August 1, 1883. Albatross Station (2051). Length 280 to 440 (?) mm.

3 examples.

33391 U.S.N.M. N.  $41^{\circ}$   $53'$  W.  $65^{\circ}$   $35'$ . In 858 fathoms.

September 2, 1883. Albatross Station (2072). Length 210 mm.

33428 U.S.N.M. N.  $41^{\circ}$   $53'$  W.  $65^{\circ}$   $35'$ . In 858 fathoms.

September 2, 1883. Albatross Station (2072). Length 338 to 478 mm.  
3 examples.

33539 U.S.N.M. N.  $41^{\circ} 11' 30''$  W.  $66^{\circ} 12' 20''$  . In 499 fathoms. September 4, 1883. Albatross Station (2078). Length 435 mm. (?). Very poorly preserved.

33442 U.S.N.M. N.  $41^{\circ} 9' 40''$  W.  $66^{\circ} 2' 20''$  . In 1253 fathoms. September 4, 1883. Albatross Station (2077). Length 668 to 680 mm. 2 examples.

35457 U.S.N.M. N.  $39^{\circ} 45' 30''$  W.  $70^{\circ} 17'$  . In 961 fathoms. August 4, 1884. Albatross Station (2191). Length 148 mm.

35518 U.S.N.M. N.  $39^{\circ} 39' 45''$  W.  $71^{\circ} 35' 15''$  . In 538 fathoms. August 19, 1884. Albatross Station (2201). Length 244 mm.

35570 U.S.N.M. N.  $39^{\circ} 35'$  W.  $71^{\circ} 18' 45''$  . In 1073 fathoms. August 20, 1884. Albatross Station (2205). Length 275 (?) to 320 (?) mm. 3 examples. All poorly preserved.

35573 U.S.N.M. N.  $39^{\circ} 39' 45''$  W.  $71^{\circ} 35' 15''$  . In 538 fathoms. August 19, 1884. Albatross Station (2201). Length 325 mm.

35583 U.S.N.M. N.  $39^{\circ} 35'$  W.  $71^{\circ} 24' 30''$  . In 1043 fathoms. August 20, 1884. Albatross Station (2206). Length 430 mm.

35587 U.S.N.M. N.  $39^{\circ} 47'$  W.  $70^{\circ} 30' 30''$  . In 963 fathoms. August 22, 1884. Albatross Station (2216). Length 350 (?) mm. 2 examples.

35588 U.S.N.M. N.  $39^{\circ} 39' 45''$  W.  $71^{\circ} 18' 45''$  . In 991 fathoms. August 21, 1884. Albatross Station (2210) Length 400 mm.

35630 U.S.N.M. N.  $38^{\circ} 36' 30''$  W.  $73^{\circ} 6'$  . September 12, 1884. Albatross Station (2233). Length 250 mm.



- 38091 U.S.N.M. N.  $39^{\circ} 35'$  W.  $70^{\circ} 54'$  . In 1106 fathoms.  
 July 17, 1886. Albatross Station (2684). Length 428 mm.
- 38111 U.S.N.M. N.  $39^{\circ} 35'$  W.  $70^{\circ} 54'$  . In 1106 fathoms.  
 July 17, 1886. Albatross Station (2684). Length 440 mm.
- 38148 U.S.N.M. N.  $36^{\circ} 42'$  W.  $74^{\circ} 30'$  . In 727 fathoms.  
 October 25, 1886. Albatross Station (2730). Length 298 mm.
- 38199 U.S.N.M. N.  $37^{\circ} 26'$  W.  $73^{\circ} 43'$  . In 944 fathoms.  
 October 26, 1886. Albatross Station (2733). Length 350 mm.
- 38206 U.S.N.M. N.  $36^{\circ} 36'$  W.  $74^{\circ} 32'$  . In 679 fathoms.  
 October 23, 1886. Albatross Station (2729). Length 150 to 223 mm.  
 2 examples.
- 38209 U.S.N.M. N.  $36^{\circ} 30'$  W.  $74^{\circ} 33'$  . In 859 fathoms.  
Albatross Station (2728). Length 205 mm.
- 39194 U.S.N.M. N.  $37^{\circ} 34' 30''$  W.  $73^{\circ} 58''$  . In 811 fathoms.  
 September 17, 1885. Albatross Station (2739). Length 370 mm. (?).
- 39206 U.S.N.M. N.  $37^{\circ} 34' 30''$  W.  $73^{\circ} 58''$  . In 811 fathoms.  
 September 17, 1887. Albatross Station (2739). Length 320 mm. (?).  
 1 example U.S.N.M. N.  $41^{\circ} 38'$  W.  $124^{\circ} 17' 30''$  . In 38  
 fathoms. Albatross Station (2117). Length 300 mm. Badly preserved  
 after capture.
- 1 example U.S.N.M. N.  $28^{\circ} 43'$  W.  $87^{\circ} 14' 30''$  , Gulf of  
 Mexico. In 525 fathoms. March 13, 1885. Albatross Station (2393).  
 Length 50 mm.
- 1 example U.S.N.M. N.  $39^{\circ} 47' 07''$  W.  $70^{\circ} 35' 00''$  , Cape  
 Sable to Cape May. In 721 fathoms. August 9, 1885. Albatross  
 Station (2552). Length 280 mm.

Alepocephalus tenebrosus Gilbert

Alepocephalus tenebrosus GILBERT, Proc. U.S.N.M. , vol. 14, 1891, p. 545.

Albatross 2839, 2923, 2936 and 2980, 359 to 822 fathoms, Santa Barbara Channel. - GOODE and BEAN, Oceanic Ichth., 1895, p. 510 (reference).  
- JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.1, 1896, p.453 (compiled). - TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist. New York, vol.52, art.1, May 16, 1925, p.8, pl.2, fig.1, southwest of Santa Barbara Islands  $33^{\circ}$  to  $23^{\circ}$  off Cape San Lucas, Lower California, 630 to 640 fathoms.

Depth  $5 \frac{1}{2}$  to 6; head  $2 \frac{7}{8}$  to  $3 \frac{1}{5}$ , width 3. Snout  $3 \frac{1}{5}$  to  $3 \frac{1}{4}$  in head/ measured to eye; orbit  $3 \frac{1}{2}$  to  $4 \frac{1}{4}$ ; eye  $4 \frac{1}{2}$  to  $5 \frac{1}{5}$ .  $1 \frac{1}{2}$  in snout, greater than interorbital; maxillary reaches to or  $\frac{1}{3}$  in eye with age, expansion 2 to  $2 \frac{1}{5}$ , length  $2 \frac{2}{5}$  to  $3 \frac{1}{5}$  in head; end of mandible with slight terminal symphyseal denticle or spur; interorbital 6 to  $6 \frac{3}{5}$ , low, with wide concavity extending to occiput. Gill rakers 8 + 16, lanceolate,  $1 \frac{1}{4}$  in eye; gill filaments  $\frac{3}{4}$  gill rakers.

Scales 85 to 90 counted along and close above lateral line to caudal base; 12 or 13 scales above lateral line, 12 or 13 below, 53 to 58 predorsal forward to occiput. Scales very caducous, usually all fallen .

D. 17 or 18, rays mostly broken, fin height  $3 \frac{3}{4}$  in head, origin in young nearer head than caudal base, with age much nearer caudal base; A. 17 to 19, rays mostly broken, fin height 3 in head, opposite dorsal origin in young to more posterior with age; caudal damaged, evidently forked, rudimentary rays 16 above or below, more developed in young when extended well forward towards dorsal and anal, little conspicuous with age; least

depth of caudal peduncle  $4 \frac{4}{5}$ ; pectoral  $2 \frac{3}{4}$  to  $3 \frac{2}{3}$ ; ventral  $3 \frac{1}{4}$  (?)  
to  $3 \frac{2}{3}$ .

Head black. Iris neutral slate, pupil ivory to brownish white.  
Inside gill opening black. Body brown, dark or dusky towards head and belly,  
often otherwise with deep dusky chesnut tinge. Fins all brownish.

Off California and lower California.

46726 U.S.N.M. N.  $33^{\circ} 8'$  W.  $118^{\circ} 40''$ . In (?) fathoms.

Albatross Station 2839. May 8, 1888. Length 85 to 128 mm. 3 examples.

77464 U.S.N.M. Point Loma Light House, N.  $32^{\circ}$  E., 10.6 miles,  
California. Albatross Station 4307. Length 100 to 139 mm. 3 examples.  
March 2, 1904.

77465 U.S.N.M. Point Loma Light House, N.  $36^{\circ}$  E., 12.3 miles.  
March 14, 1904. Albatross Station 4351. Length 84 mm.

77466 U.S.N.M. Gull Islet, s. coast of Santa Cruz Island, N.  
 $21^{\circ}$  W., 2.9 miles. April 14, 1904. Albatross Station 4429. -  
Point Pinos Light House, S.  $18^{\circ}$  E., 8.1 miles. May 23, 1904.  
Albatross Station 4515. Length 168 to 288 mm. 2 examples.

87558 U.S.N.M. Albatross Station 5688. April 23, 1911. In  
525 fathoms. Length 354 mm.

Alepocephalus convexifrons Garman

Alepocephalus convexifrons GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899,

p. 292, pl.59, fig.2, N.  $16^{\circ} 33'$  W.  $99^{\circ} 52' 30''$ , 660 fathoms,

Gulf of Panama.

#  
Depth 5; head 3. Snout to eye  $3 \frac{1}{4}$  in head; orbit  $3 \frac{3}{4}$ ; eye  $5 \frac{1}{8}$ ,  
 $1 \frac{1}{2}$  in snout; maxillary reaches  $\frac{2}{5}$  in eye, expansion  $2 \frac{1}{6}$  in eye, length

$2 \frac{4}{5}$  in head; teeth small, uniserial on premaxillaries, dentaries and palatines; interorbital low. Gill rakers  $7 + 15$ ,  $\frac{1}{2}$  of eye.

Scales 90 in lateral line; 8 above, 10 below.

D. 18, fin base  $2 \frac{1}{2}$  in head, fin origin little before anal origin; A. 19, fin base  $2 \frac{1}{2}$  in head; caudal damaged, evidently deeply emarginate; least depth of caudal peduncle  $4 \frac{2}{5}$ ; paired fins damaged, evidently small.

Deep black over surface and on linings of interior. Length 305 mm.

(Garman).

Gulf of Panama.

Alepocephalus fundulus Garman

Alepocephalus fundulus GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.293, pl.57, fig.2. N.  $6^{\circ} 17'$  W.  $82^{\circ} 5'$ , 1672 fathoms; N.  $7^{\circ} 5'$   $30''$  W.  $79^{\circ} 40'$ , 1270 fathoms, Gulf of Panama.

Depth  $5 \frac{1}{4}$ ; head 3. Snout  $3 \frac{1}{4}$  in head; eye 5,  $1 \frac{3}{5}$  in snout,  $1 \frac{1}{2}$  times interorbital; maxillary reaches  $\frac{2}{5}$  in eye, expansion  $2 \frac{1}{6}$  in eye, length  $2 \frac{3}{4}$  in head; teeth small, subconic, on premaxillaries, dentaries and palatines; interorbital low. Gill rakers  $7 + 14$ , less than half eye.

Scales 90 in lateral line; 10 above, 12 below.

D. 16 or 17, fifth branched ray  $5 \frac{1}{2}$  in head; A. 17, tenth branched ray  $5 \frac{1}{3}$ ; caudal damaged, evidently forked; least depth of caudal peduncle  $4 \frac{1}{2}$ ; pectoral  $2 \frac{3}{5}$ ; ventral  $4 \frac{1}{3}$ .

Entire surface and linings of body cavities deep black. Length 420 mm. (Garman.)

Gulf of Panama.

Alepocephalus microlepis Lloyd

Alepocephalus microlepis LLOYD, Mem. Indian Mus., vol.2, 1903, No.3, p.146,  
pl.44, fig.4. Arabian Sea, 600 to 850 fathoms.

Depth 4 (adult) to 6 (young); head  $3 \frac{2}{5}$  to  $3 \frac{4}{5}$ , width  $2 \frac{1}{10}$  to  $2 \frac{4}{5}$ . Snout  $2 \frac{3}{4}$  to  $2 \frac{4}{5}$  in head; 8 marginal rounded horizontal keels form series around front edge of snout; orbit  $3 \frac{1}{2}$  to  $3 \frac{3}{5}$ ; eye  $5 \frac{1}{8}$  to  $6 \frac{1}{2}$ ,  $1 \frac{1}{2}$  to  $1 \frac{4}{5}$  in snout,  $1 \frac{1}{3}$  to 2 in interorbital; mandible included in upper jaw; maxillary reaches  $\frac{7}{8}$  or to front eye edge, expansion 2 to  $2 \frac{1}{4}$  in eye, length  $2 \frac{7}{8}$  to 3 in head; interorbital 4 to  $4 \frac{1}{3}$ , with ridge each side and broad deep groove on concavity to occiput where expanding or widening. Gill rakers 1 + 12, lanceolate, equal gill filaments or 2 in eye.

Scales 85 to 95 along and close above lateral line to caudal base; tubes 50 in lateral line to caudal base;  
15 scales above, 15 below, 59 or 60 predorsal forward to occiput. Dorsal, anal and caudal bases scaly. Scales caducous, most all fallen. Scales with rather long, narrow, median basal notch; circuli very fine, close set, chiefly marginal.

D. 24, I, origin nearer caudal base than gill opening; A. 31, I to 35, I, origin midway between hind preopercle edge and caudal base; caudal (damaged) small, forked, rudimentary rays 14 or 15 above or below and extend well forward; least depth of caudal peduncle  $4 \frac{2}{5}$  to  $5 \frac{1}{4}$  in head; pectoral  $2 \frac{3}{4}$  (?); ventral (damaged) inserted nearly midway between snout tip and caudal base or little nearer caudal.

Head black. Iris neutral black, pupil ivory white. Body brown, scale pockets dusky or blackish brown, finely reticulated in appearance. Fins

dusky.

Indian Ocean. Though I place the material below with this species Lloyd's account differs a little in that he gives the scales 125 in the lateral line though only 30 to 35 transversely. He also gives D. 20 to 22 and A. 30 to 32.

9972. D. 5465. Atulayan Island (E.), S. 50° W., 7.3 miles (N. 13° 39' 42" E. 123° 40' 39"), east coast of Luzon. In 500 fathoms. June 17, 1909. Length 116 mm.

2948. D. 5467. Atulayan Island (S.) S. 79° W., 2.5 miles (N. 13° 35' 27" E. 123° 37' 18") In 480 fathoms. June 18, 1909. Length 195 mm. Very poor.

4212. D. 5468. Atulayan Island (S.), S. 83° W. 5.7 miles (N. 13° 35' 39" E. 123° 40' 28"). In 569 fathoms. June 18, 1909. Length 198 mm.

2876 and 2877. D. 5469. Atulayan Island (E.), S. 63° W., 4 miles (N. 13° 36' 48" E. 123° 38' 24"), In 500 fathoms. June 18, 1909. Length 93 to 235 (?) mm. 2 examples.

2927. D. 5470. Atulayan Island (E.), S. 68° W., 6.7 miles (N. 13° 37' 30" E. 123° 41' 09"). In 560 fathoms. June 18, 1909. Length 178 mm.

10228. D. 5610. Batu Daka Island (S.), N. 87° W., 20.9 miles (N. 0° 36' S. 122° 1'), Gulf of Tomini, Celebes. In 678 fathoms. November 19, 1909. Length 285 (?) mm. Very poorly preserved.

Alepocephalus salmoneus Gill and Townsend

Ericara salmonea GILL and TOWNSEND, Proc. Biolog. Soc. Washington, vol. 11,

Sep.17, 1897, p.232. Bering Sea southwest of Pribilof Islands,  
Albatross Station 3603, 1771 fathoms. - JORDAN and EVERMANN, Bull.  
U.S.Nat. Mus., No. 47, pt.3, 1898, p.2816 (compiled).

Depth 5; head  $2 \frac{3}{4}$ , width  $2 \frac{1}{8}$ . Snout  $2 \frac{7}{8}$  in head measured to  
eye; orbit  $4 \frac{1}{5}$ ; eye 7,  $2 \frac{1}{2}$  in snout,  $2 \frac{1}{2}$  in interorbital;  $\wedge$  maxillary  
reaches  $\frac{3}{4}$  in eye, expansion  $1 \frac{3}{5}$ , length 2 in head; interorbital  $3 \frac{1}{2}$ ,  
level, followed by concavity on cranium before occiput. Gill rakers 2 + 14,  
flexible, lanceolate;  $\frac{1}{2}$  of eye, subequal with gill filaments.

Scales 108 in lateral line to caudal base; 12 above, 16 below, 75  
predorsal to occiput. Vertical fins with some basal scales. Scales largely  
adherent in pockets when present, deeply imbedded, small, rounded, thin;  
circuli ill defined, imperfectly longitudinal, over which feebly defined  
concentric whorls. Head naked.

D. 17, rays broken, longest apparently about subequal with orbit, fin  
base  $2 \frac{4}{5}$  in head, fin origin midway between end of depressed pectoral and  
caudal base; A. 24, rays broken, fin height at least equals orbit, fin base  
2 in head, fin origin little before dorsal origin; caudal damaged, apparently  
emarginate, rudimentary rays 15 above or below, inconspicuous; pectoral  
 $3 \frac{3}{4}$  (?) in head, rather small; ventral inserted little nearer anal origin,  
than pectoral origin, fin small, apparently long as orbit (?); vent midway  
between ventral and anal origins.

Head black. Iris black, pupil light brown. Inside gill opening and  
mouth livid black. Body dusky brown, scales adhering all lighter. Fins  
livid blackish, like head.

Bering Sea. In general appearance, especially with its toothless

maxillary, approaching Alepocephalus.

48769 U.S.N.M. N.  $55^{\circ} 23'$  W.  $17^{\circ} 31'$ . In 1771 fathoms.

Albatross Station 3603. August 11, 1895. Length 660 (?) mm., caudal damaged. Type.

Alepocephalus niger <sup>"</sup>Günther

Alepocephalus niger <sup>"</sup>GÜNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, Sep. 1, 1878, p.248. Seventy five miles east south-east of Raine Island, Queensland (north of Australia), in 1400 fathoms. - MACLEAY, Proc. Linn. Soc. New South Wales, vol.6, 1881, p.264 (copied).- <sup>"</sup>GÜNTHER, Rep. Voy. Challenger, vol.22, 1887, p.224, pl.56, fig. B (type).- GOODE and BEAN, Oceanic Ichth., 1895, p.36 (reference).

Pterothrissus gissu (not HILGENDORF) GOODE and BEAN, Oceanic Ichth., 1895, pl.14, fig.52 (error in transposition).

Depth  $5 \frac{4}{5}$ ; head 3. Snout  $3 \frac{1}{4}$  in head; eye  $5 \frac{4}{5}$ ,  $1 \frac{7}{8}$  in snout; maxillary reaches eye, expansion 2 in eye, length 3 in head; lower jaw shorter than upper; interorbital low. Gill rakers +14, stout, pointed.

Scales 140 in lateral line, cycloid.

D. 21, origin over first sixth of anal base, fin height  $6 \frac{3}{4}$  in head; A. 27, fin height  $5 \frac{2}{3}$ ; caudal  $2 \frac{2}{3}$ ; pectoral  $2 \frac{3}{4}$ ; ventral  $3 \frac{2}{3}$ .

Uniform deep black. In life light blue, deeper tint about fins and gill covers. Length 330 mm. (<sup>"</sup>Günther.)

Off Queensland.



## Subgenus CONOCARA Goode and Bean

Alepocephalus macropterus Vaillant

Alepocephalus macropterus VAILLANT, Expéd. Sci. Travailleur et Talisman.

Poiss., 1888, p.150, pl.11, figs. 2 a-c. Coast of Morocco, 2075 to 2115 meters; Canaries, 865 meters; coasts of Soudan, 882 to 1435 meters; Banc d' Arguin, 1550 meters.

Conocara macroptera GOODE and BEAN, Oceanic Ichth., 1895, p.39, pl.12, fig.

43 (compiled). - JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.

1. 1896, p.457 (compiled). - MURRAY and HJORT, Depths of the Ocean,

1912, p.394, fig.263 (off Morocco, 2300 meters). - ROULE, Res. Camp.

Sci. Monaco, vol.52, 1919, p.5 (south of Pico, 1550 meters).

Depth  $7 \frac{3}{5}$ ; head  $3 \frac{1}{4}$ , width  $2 \frac{3}{4}$ . Snout measured to eye  $2 \frac{3}{4}$  in head; orbit 3; eye  $4 \frac{1}{3}$ ,  $1 \frac{1}{2}$  in snout,  $1 \frac{1}{4}$  in interorbital; maxillary reaches orbit, expansion  $2 \frac{1}{4}$  in eye, length  $2 \frac{7}{8}$  in head; interorbital  $3 \frac{1}{2}$ , low, with broad median depression, widening at occiput. Gill rakers  $1 + 17$ , lanceolate, rather weakly spinescent,  $3 \frac{1}{2}$  in eye, 3 times gill filaments.

Scales about 190 in lateral line to caudal base; tubes about 55 (?) in lateral line to caudal base; 22 scales above, 22 below, about 138 predorsal forward to occiput. Dorsal, anal and caudal bases scaly. Scales thin, simple, adherent about fore part of body. Scales cycloid, though without striae; circuli obsolete, imperfectly concentric.

D. V, 15, I, fin height  $4 \frac{1}{4}$  in head, fin origin over middle of anal base; A. 36, I, rays all branched, fin height  $4 \frac{3}{4}$ , fin origin midway be-

tween hind eye edge and caudal base caudal  $2 \frac{4}{5}$  (?), forked, rudimentary ray 15 above or below, rather prominent and extend well forward; least depth of caudal peduncle  $6 \frac{1}{2}$ ; pectoral  $3 \frac{1}{4}$  (?); ventral 4, fin origin midway between snout tip and caudal base.

Head black. Iris and orbit neutral black, pupil pale buff white. Body dark russet brown, darker to blackish brown anteriorly or about head. Inside gill openings blackish. Fins pale, paired ones more dusky.

Atlantic Ocean.

44576 U.S.N.M. N.  $31^{\circ} 48'$  W.  $137^{\circ} 19' 30''$ . October 18, 1891

Albatross Station 2751. Length 225 mm.

Alepocephalus mcdonaldi (Goode and Bean)

Conocara mcdonaldi GOODE and BEAN, *Oceanic Ichth.*, 1895, p.39, pl.13, fig.48.

N.  $24^{\circ} 36'$  W.  $84^{\circ} 5'$ , 955 fathoms; N.  $24^{\circ} 36'$  W.  $84^{\circ} 5'$ , 955 fathoms; N.  $28^{\circ} 47' 30''$  W.  $87^{\circ} 27'$ .

Conocara Macdonaldi JORDAN and EVERMANN, *Bull. U.S. Nat. Mus.*, No.47, pt.1, 1896, p. 457 (compiled).

Depth  $6 \frac{2}{3}$ ; head  $3 \frac{1}{8}$ , width  $2 \frac{1}{3}$ . Snout  $3 \frac{1}{4}$  in head; orbit  $3 \frac{1}{4}$ ; eye  $5 \frac{2}{5}$ , 2 in snout, 2 in interorbital; maxillary reaches orbit, expansion 2 in eye, length  $3 \frac{1}{5}$  in head; interorbital  $2 \frac{4}{5}$ , bony interorbital  $5 \frac{1}{8}$  depressed, largely concave medially. Gill rakers  $2 + 14$ , lanceolate, 3 in eye, twice gill filaments.

Scales 216 along and close above lateral line to caudal base; 56 rather elongate and large tubes in lateral line to caudal base; 24 scales above, 28 below, 130 predorsal forward to occiput. Bases of vertical fins finely

scaly. Scales simple, thin, cycloid, adherent; circuli fine and imperfect.

D. VIII, 13, I, origin slightly before middle of anal base, first branched ray 5 in head; A. IV, 33, I, fin height 5; caudal  $2 \frac{3}{5}$ , small, forked, 16 rudimentary rays above or below, extend well forward toward dorsal and anal fins; least depth of caudal peduncle  $5 \frac{1}{3}$ ; pectoral  $2 \frac{4}{5}$ ; ventral  $4 \frac{1}{5}$  (?).

Head blackish. Iris neutral black, large pupil ivory white. Adipose eyelids dark neutral gray. Inside gill openings and mouth blackish. Body light brown, sooty or dusky on belly. Fins pale, paired darker.

Atlantic Ocean.

39482 U.S.N.M. N.  $28^{\circ} 47' 30''$  W.  $87^{\circ} 27'$ . In 724 fathoms.

1885 Albatross Station 2392. Length 208 mm. Type.

47651 U.S.N.M. N.  $24^{\circ} 36'$  W.  $84^{\circ} 5'$ . In 955 fathoms. BLAKE Station CLXV. Length 147 mm. Very poorly preserved.

#### HALISAURICEPS new genus

Type Alepocephalus longiceps Lloyd.

Body elongate, strongly compressed, rather deep. Caudal peduncle small. Head large, conic, sides flattened below. Snout protrudes in point before mandible tip. Eye moderate, high, nearly median in head length. Mouth rather small, wide. Teeth minute or obsolete, or only few feeble ones on premaxillaries or front edges of mandible. Interorbital and top of head depressed. Gill rakers lanceolate. Scales large, thin, cycloid, very caducous, most all lost in preserved examples. Dorsal and anal similar, posterior, opposite. Caudal small. Pectoral short. Ventral small, midway in body.

Diagnosis. This genus is related to Alepocephalus and allied genera

chiefly in its toothless maxillaries, though its dentition unusually feeble. It appears unique in its pointed snout, so that its physiognomy recalls superficially certain Halosauridae.<sup>1</sup>

---

<sup>1</sup> Halisaurus; ceps, head.

---

Halisauriceps longiceps (Lloyd)

Alepocephalus longiceps LLOYD, Mem. Indian Mus., vol.2, 1903, p.147, pl.44, fig.2. Bay of Bengal, 693 fathoms.

Depth  $5 \frac{3}{4}$  to 6; head 3 to  $3 \frac{1}{5}$ , width 3. Snout  $2 \frac{2}{3}$  to  $2 \frac{4}{5}$  in head; <sup>from snout tip to eye,</sup> orbit 4 to  $4 \frac{1}{8}$ ; eye  $5 \frac{1}{5}$  to 7,  $2 \frac{1}{4}$  in snout, 1 to  $1 \frac{2}{5}$  in interorbital; maxillary reaches eye to  $1 \frac{1}{8}$  in eye, expansion  $2 \frac{3}{4}$  to 3 in eye, length  $2 \frac{2}{5}$  to  $2 \frac{3}{4}$  in head from snout tip; interorbital  $4 \frac{7}{8}$  to 5, low, level. Gill rakers ~~6~~ 10, lanceolate, about twice gill filaments or 2 in eye.

Scales 52 in lateral line to caudal base; 6 above, 35 predorsal. Apparently bases of vertical fins scaly. Scales most all fallen, very caducous. Tubes in lateral line long, slender, well exposed on few remaining scales.

D. VI, 12, I or VI, 13, I, rays all broken, fin bases subequal with those of anal or  $3 \frac{3}{4}$  to 5 in total body length without caudal; A. VI, 16, I or VI, 17, I, rays all broken; caudal damaged, rudimentary rays well developed though little conspicuous; least depth of caudal peduncle  $4 \frac{3}{5}$  to  $5 \frac{1}{4}$  in head; pectoral damaged, evidently would seem not to reach over

half way to ventral; ventral damaged, fin origin slightly nearer snout tip than caudal base.

Head black. Iris black, pupil ivory white. Body brown. Fins dusky.

Bay of Bengal, Philippine Seas, Malassar Strait. The materials listed below are identified with this species as they seem to represent the adult stages. The following is condensed from Lloyd's description and figure:

Depth  $6 \frac{1}{8}$ ; head  $2 \frac{1}{2}$ . Snout  $2 \frac{3}{4}$  in head, protrudes in sharp slender point before mandible tip; eye  $5 \frac{1}{5}$ , 2 in snout; maxillary reaches  $\frac{7}{8}$  to eye, expansion  $2 \frac{3}{4}$  in eye, length  $2 \frac{7}{8}$  in head; minute teeth on premaxillary, dentary, vomer and palatine; interorbital low. Gill rakers long, numerous, lanceolate, acute.

Scales 52 in lateral line; 5 above, 6 below.

}D. 20, origin over anal origin; A. 23; least depth of caudal peduncle  $6 \frac{1}{3}$  in head; pectoral  $7 \frac{4}{5}$ , rays 10; ventral  $7 \frac{1}{3}$  (?) in head, rays 6. Length 90 mm.

10198. D. 5470. Atulayan Island (E.), S.  $68^{\circ}$  W., 6.7 miles (N.  $13^{\circ} 37' 30''$  E.  $123^{\circ} 41' 9''$ ), east coast of Luzon. In 560 fathoms. June 18, 1909. Length 230 (?) mm.

3807. D. 5668. Mamuju Island (E.), 10.6 miles (S.  $2^{\circ} 28' 15''$  E.  $118^{\circ} 49'$ ), Macassar Strait. In 901 fathoms. December 29, 1909. Length 250 mm.

2120. D. 5460. Sialat Point Light, N.  $24^{\circ}$  E., 8.2 miles (N.  $13^{\circ} 32' 30''$  E.  $123^{\circ} 58' 6''$ ) east coast of Luzon. In 565 fathoms. June 10, 1909. Length 200 (?) mm.

3208. D. 5472. Sialat Point Light, N.  $63^{\circ}$  E., 13.6 miles

(N. 13° 33' 36" E. 123° 49'). In 550 fathoms. June 19, 1909.

Length 195 mm.

Genus XENOGNATHUS Gilbert

Xenognathus GILBERT, Proc. U.S. Nat. Mus., vol. 48, 1915, p.311. Type Xenognathus profundorum GILBERT, orthotypic.

# Body compressed, elongate. Head deeper than wide. Snout depressed # at tip, bounded anteriorly by strong, sharp, osseous crest on basal part of premaxillaries. Eye rather small, anterior. Premaxillary greatly expanded, forms plate extending nearly horizontally backward and completely receives deep mandible within. Teeth slender, cardiform, present on premaxillaries, mandible and front of palatines. Opercular flap voluminous. Gill membranes separate. Branchiostegals 6. Scales very small, cycloid, pores in lateral line larger or about 62. Dorsal shorter than anal, origin behind anal origin. Caudal forked.

One species in the Eastern Pacific.

Xenognathus profundorum Gilbert

Xenognathus profundorum GILBERT, Proc. U.S. Nat. Mus., vol.48, 1915, p.311, pl.14, fig.2. N. 33° 2' 15" W. 120° 42', 1350 to 2182 fathoms, off Catalina Island.

Depth  $4 \frac{1}{3}$ ; head 3, width  $2 \frac{1}{2}$ . Snout to eye 3 in head; orbit 4; eye  $6 \frac{1}{3}$ , 2 in snout to eye, 2 in interorbital,  $1 \frac{3}{5}$  in bony interorbital; maxillary reaches opposite hind eye edge, expansion  $1 \frac{4}{5}$  in eye, length  $2 \frac{1}{4}$  in head; interorbital  $3 \frac{1}{5}$ , bony interorbital  $4 \frac{1}{5}$ , with broad convex ridge above each eye, separated by broad median depression extending back to become deeper and larger just before occiput. Gill rakers 4 + 14, lanceolate,  $1 \frac{3}{4}$

in eye; gill filaments  $4/5$  of gill rakers.

Scales 122 in lateral line to caudal base; 17 above. 26 below, 100 predorsal. Vertical fins with scaly bases. Scales rather firmly adherent, small, thin, in rather even longitudinal rows, smaller about edges of body and fin bases. Scales also with more or less ill defined weak circuli, these weakly or imperfectly concentric.

D. 20, rays broken, fin base  $2 \frac{1}{3}$  in head, fin origin little nearer caudal base than pectoral origin, or over first fourth of anal base; A. 28, rays broken, fin base  $1 \frac{3}{5}$  in head, fin origin slightly nearer gill opening than caudal base; caudal damaged, evidently small, rudimentary rays 10 or 11 above or below, rather prominent and extend forward well toward dorsal and least depth of caudal peduncle  $3 \frac{2}{3}$ ; anal; pectoral  $2 \frac{1}{3}$ ; ventral damaged, apparently equals orbit; vent close before anal origin.

Head blackish. Iris neutral black, pupil light brown. Body dark brown. Fins brown.

Off California.

75826 U.S.N.M. N.  $33^{\circ} 2' 15''$  W.  $120^{\circ} 42'$ , off Santa Catalina Island. Albatross Station 4390, March 28, 1904. Length 462 mm. Type.

Genus LEPTOCHILICHTHYS Garman

Leptochilichthys GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.284. Type

Leptochilichthys agassizii GARMAN, monotypic.

Body elongate, compressed, tapering rather narrowly posteriorly. Head large, deeper than wide. Snout deep, blunt, thick. Mouth wide. Maxillary long, wide, extends well beyond eye. Upper jaw toothless; small uniserial

teeth in lower jaw, vomer and palatines. Gill membranes not united, free from isthmus. Gill rakers long, numerous, leathery. Branchiostegals 13. Pseudo-branchiae present. Scales moderate, cycloid, smaller on lateral line. Dorsal postmedian; base entirely before anal. Caudal forked. Paired fins small.

One species in the Eastern Pacific, with the aspect of Bathytroctes.

Leptochilichthys agassizii Garman

Leptochilichthys agassizii GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.285, pl.58, fig.3. N.  $1^{\circ} 7'$  W.  $80^{\circ} 21'$ , 1573 fathoms, Gulf of Panama.

Depth  $4 \frac{1}{2}$ ; head  $2 \frac{2}{3}$ , width about 2. Snout to eye  $4 \frac{1}{6}$  in head; orbit  $5 \frac{4}{5}$ , eye  $1 \frac{7}{8}$  in snout; equal interorbital maxillary extends  $1 \frac{1}{2}$  eye diameters behind eye, expansion  $1 \frac{1}{5}$  in eye, length  $1 \frac{2}{3}$  in head; interorbital moderately high. Gill rakers  $8 + 19$ .

Scales 64 along close above lateral line; 5 above, 5 below. Fins not scaly.

D. 14, posterior rays higher or 7 in head; A. 13, fin height  $8 \frac{1}{5}$ ; caudal small, length  $2 \frac{3}{5}$ ; least depth of caudal peduncle  $4 \frac{3}{4}$ ; pectoral  $4 \frac{2}{3}$ ; ventral  $4 \frac{2}{3}$ .

Black on body, head, fins and linings. Length 305 mm. (Garman.)

} Gulf of Panama.

Genus Asquamiceps Zugmayer

Asquamiceps ZUGMAYER, Bull. Inst. Océanogr. Monaco, No.193, January 20, 1911, p.2. Type Asquamiceps velaris ZUGMAYER, monotypic.

Body elongate, tapering back rather narrowly and slenderly posteriorly.



Head very large, nearly equals rest of body to caudal base. Snout rather short, narrowly triangular in profile. Eye moderate. No upper teeth, mandibular microscopic. Interorbital broad, level. Opercle very large, prolonged as membranous lobe overhanging pectoral base. Gill membranes largely united. Scales small, irregular, crowded, cycloid. Head naked or scaly. Dorsal and anal opposite, similar, well posterior. Caudal forked. Pectoral with deep base. Ventral small, close before anal.

Atlantic and East Indies. Known chiefly by its enormous head which nearly long as rest of body without caudal.

#### ANALYSIS OF SPECIES.

a.<sup>1</sup> ASQUAMICEPS. Head naked; mandible very slightly protruded; maxillary reaches  $4/5$  in eye. velaris.

a.<sup>2</sup> MEGALEPOCEPHALUS new subgenus. Head somewhat scaly; mandible included within upper jaw; maxillary reaches slightly behind eye.

longmani.

#### Subgenus ASQUAMICEPS Zugmayer

Mandible slightly protrudes in front.

Maxillary reaches  $4/5$  in eye.

Branchiostegals 5. Head naked.

Dorsal and anal inserted little behind last third <sup>in</sup> length without caudal.

#### Asquamiceps velaris Zugmayer

Asquamiceps velaris ZUGMAYER, Bull. Inst. Océan. Monaco, No.193, January 20,

1911, p.2. N.  $36^{\circ} 6'$  W.  $0^{\circ}$ , 3660 meters, off Portugal; Rés. Camp. Sci.

Sci. Monaco, vol.35, 1911, p.10, pl.1, fig.4 (type). - NORMAN, Discovery Rep.,

7. Vol. 2, 1950, p. 257, (S.  $33^{\circ} 50'$  to  $34^{\circ} 15'$  E.  $16^{\circ} 4'$  to  $15^{\circ} 49'$ , 2500 meters).

Depth  $4 \frac{1}{8}$ ; head  $2 \frac{1}{10}$ . Snout  $4 \frac{4}{5}$  in head from snout tip; eye  $4 \frac{4}{5}$ ; equals snout; maxillary reaches  $\frac{4}{5}$  in eye, expansion  $2 \frac{2}{3}$  in eye, length  $2 \frac{7}{8}$  in head from snout tip; mandible slightly protrudes in front.

Scales 75 in median lateral series.

D. 15, fin origin opposite anal origin, fin height  $4 \frac{7}{8}$  in total head length; A. 17, fin height  $4 \frac{2}{3}$ ; caudal  $2 \frac{1}{2}$ , deeply forked; least depth of caudal peduncle 6; pectoral  $6 \frac{1}{4}$ ; ventral 5.

Violaceous black. Fins brownish. Length 175 mm. (Zugmayer.)

Eastern Atlantic.

MEGALEPOCERPHALUS new subgenus.

Type - Asquamiceps ~~longmani~~ new species.

Body strongly compressed, with short caudal peduncle. Head  $\frac{3}{7}$  body length to caudal base. Snout obtuse, conic. Mouth large, lower jaw included within upper. Preopercle rather close behind eye and end of maxillary. Gill opening extends forward opposite hind end of maxillary where membrane forms broad free fold across isthmus. Branchiostegals 4. Body covered with rather close set, deeply imbedded, elongate, thin scales. Head largely scaly or at least large imbedded cycloid scales on cheeks, postocular, cranium and opercles. Dorsal and anal inserted little before last third in length without caudal.

Diagnosis. Differs from subgenus Asquamiceps as set forth in the preceding "analysis of species."

(Méyas, large; Alepocephalus; with reference to the very large head.)

Asquamiceps longmani new species

Depth  $4 \frac{1}{5}$ ; head  $2 \frac{1}{3}$ , width 3. Snout 4 in head from snout tip to eye; orbit 5; eye  $6 \frac{1}{2}$ ,  $1 \frac{2}{5}$  in snout,  $1 \frac{3}{5}$  in interorbital; maxillary reaches very slightly behind eye, expansion 2 in eye, length  $2 \frac{2}{5}$  in head; upper jaw and palate toothless, lower with single row of very fine minute simple uniform teeth; lower jaw slightly included within upper; interorbital  $4 \frac{1}{8}$ , broad, nearly level, depressed medially. Gill rakers 7 + 14, lanceolate, 5 or 6 times longer than gill filaments, equal eye.

Scales 60 along close above lateral line to caudal base; tubular scales 45 in lateral line to caudal base; 11 above, 11 below, 42 predorsal forward to occiput. Apparently no scales or very few on fin bases. Scales with single horizontal apical stria; circuli fine, irregular, ill defined.

D. VII, 13, I, opposed to anal or fin origins about opposite, fifth branches ray  $3 \frac{1}{3}$  in head; A. VIII, 11, I, fifth branched ray  $3 \frac{1}{8}$ ; caudal  $2 \frac{1}{5}$ , well forked, 8 or 9 rather small graduated rudimentary rays above or below; least depth of caudal peduncle 6, depressed dorsal and anal rays reaching rudimentary caudal rays; pectoral I, 15, broad, length  $3 \frac{1}{2}$  in head; ventral I, 5, inserted midway between hind pupil edge and caudal base, length 4 in head.

Most of head like lamp black, some brownish on maxillary, cheeks and opercles. Iris black, pupil ivory white. Body dark or blackish brown, more blackish on belly. Fins all dusky.

Diagnosis . Contained in the subgeneric account.

Type No.

U.S.N.M.

4229 D. 5655. Cape Tabako, N. 7 ° E., 13 miles (S. 3 ° 34 ' 10 " E. 120 ° 50 ' 30 " ), Gulf of Boni, Celebes. In 608 mm. December 18, 1909. Length 123 mm. Type.

Genus BATHYTROCTES <sup>"</sup>Gunther

Bathytroctes <sup>"</sup>GUNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, 1878, p.249.

Type Bathytroctes macrolepis <sup>"</sup>GUNTHER, designated by GOODE and BEAN, Oceanic Ichthy., 1895, p.40. Talismania GOODE and BEAN, Oceanic Ichthy. 1895, p.44. Type Bathytroctes homopterus VAILLANT, designated by JORDAN, Genera of Fishes, pt.4, 1920, p.467.

Bajacalifornia TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist., New York, vol.52, 1925, p.8. Type Bajacalifornia burragei TOWNSEND and NICHOLS, monotypic.

Body elongate, compressed. Head variably large or small. Eye usually large and prominent. Mouth well cleft, wide, jaws nearly even. Maxillary reaches eye or beyond eye. Premaxillary, maxillary, dentary, vomer and palatines with minute teeth, often feeble or deciduous on latter. Gill openings large, gills very narrow. Gill rakers lanceolate, rather long. Pseudobranchiae present. Branchiostegals 7. Pyloric caeca moderate. Scales large or small, usually very deciduous and sometimes present on opercles and cheeks. Dorsal and anal short or moderate, opposed or dorsal advanced.

## ANALYSIS OF SPECIES

- a.<sup>1</sup> TALISMANIA. Dorsal and anal origins opposite.
- b.<sup>1</sup> Head  $2 \frac{3}{5}$  to  ~~$3 \frac{3}{5}$~~  to  $2 \frac{4}{5}$ ; scales absent or very caducous.
- c.<sup>1</sup> A. 13; short spur at front tip of mandible MOLLIS.
- c.<sup>2</sup> A. 18; no mandibular spur WELSHI.
- b.<sup>2</sup> Head  $3 \frac{1}{5}$  to  $5 \frac{1}{4}$ .
- d.<sup>1</sup> Scales 43 to 47.
- e.<sup>1</sup> Maxillary reaches to or  $\frac{1}{5}$  in eye; D. 18 ANTILLARUM.
- e.<sup>2</sup> Maxillary reaches  $\frac{1}{4}$  to  $\frac{1}{3}$  in eye; A. 19 to 22 HATAI.
- e.<sup>3</sup> Maxillary reaches behind eye; D. 21. AEQUATORIS.
- d.<sup>2</sup> Scales 65 to 75; maxillary  $\frac{1}{2}$  in eye. HOMOPTERUS.
- a.<sup>2</sup> Dorsal inserted before anal origin.
- f.<sup>1</sup> BATHYTROCTES. Pectoral without long filament and caudal lobes not ending in filaments.
- g.<sup>1</sup> Scales large, 44 to 58; maxillary reaches  $\frac{1}{2}$  to hind eye edge.
- h.<sup>1</sup> Head  $2 \frac{3}{5}$  to  $3 \frac{1}{4}$ .
- i.<sup>1</sup> Lower jaw projects.
- j.<sup>1</sup> Head  $2 \frac{3}{5}$ ; maxillary reaches  $\frac{4}{5}$  in eye; lower gill rakers(?) ZUGMAYERI.
- j.<sup>2</sup> Head  $2 \frac{7}{8}$  to  $3 \frac{1}{4}$ .
- k.<sup>1</sup> Anal origin opposite middle of dorsal base; maxillary reaches well beyond eye; lower gill rakers about 17 INNESI.
- k.<sup>2</sup> Anal origin rather close behind dorsal origin; maxillary reaches

- 2/5 to 1/2 in eye; lower gill rakers 25 BURRAGEI.
- <sup>2</sup>  
i. Lower jaw included within upper; maxillary reaches hind eye  
edge ALVIFRONS.
- <sup>2</sup>  
h. Head 3 1/2 to 3 3/4.
- <sup>1</sup>  
1. D. 15; A. 11 INSPECTOR.
1. D. 16; A. 16 MACROLEPIS.
- <sup>3</sup>  
1. D. 17; A. 15 CALCARATUS.
- L. D. 18; A. 18 SQUAMOSUS.
- <sup>2</sup>  
g. Scales small, 70 to 105.
- <sup>1</sup>  
m. D. 13 or 14; A. 11.
- <sup>2</sup>  
n. Scales 75; maxillary reaches 3/4 in eye  
GRIMALDI.
- <sup>2</sup>  
n. Scales 105; maxillary reaches beyond eye  
MELANOCEPHALUS.
- <sup>2</sup>  
m. D. 15 to 20.
- <sup>1</sup>  
o. Maxillary reaches beyond eye.
- <sup>1</sup>  
p. A. 11; lower gill rakers 16 ALVEATRUS.
- <sup>2</sup>  
p. A. 15 to 18.
- <sup>1</sup>  
q. Lower gill rakers 12 STOMIAS.
- <sup>2</sup>  
q. Lower gill rakers 25 ROSTRATUS.
- <sup>2</sup>  
o. Maxillary reaches 7/8 in eye; lower gill rakers 24; A. 18  
MICROLEPIS.
- <sup>2</sup>  
f. NEMABATHYTROCTES. New subgenus. Pectoral with long filamentous ray  
reaching caudal; scales 100; head very large, 2 2/5; dorsal fin  
slightly advanced LONGIFILIS.

## Subgenus TALISMANIA Goode and Bean

Bathytroctes mollis Koehler

Bathytroctes mollis KOEHLER, Ann. Univ. Lyon, vol. 26, 1896, p.517, pl.26,

fig.2, N.  $46^{\circ} 28'$  W.  $7^{\circ}$ , 1710 meters, Gulf of Gascony.

Talismania mollis ROULE, Bull. Inst. Océanogr. Monaco, No.320, May 20, 1916,

p.11, (Terceira de Azores, 1805 meters); Rés. Camp. Sci. Monaco, vol. 52, 1919, p.6 (30 miles east of Terceira, 1805 meters).

Depth  $4 \frac{2}{5}$ ; head  $2 \frac{4}{5}$ . Snout  $3 \frac{7}{8}$  in head from snout tip; eye  $4 \frac{1}{4}$ ,  $1 \frac{1}{6}$  in snout, greater than interorbital; maxillary reaches slightly behind eye, expansion  $1 \frac{3}{4}$  in eye, length 2 in head from snout tip; lower jaw very slightly protrudes, and with short terminal conic spur directed downwards; teeth uniform, fine, short, little recurved in jaws, less numerous in mandible; interorbital low, about  $\frac{2}{3}$  of eye.

Scales absent.

D. 17, second ray 4 in head, origin opposite anal origin; A. 18, second ray 4; caudal  $3 \frac{1}{8}$ , slightly emarginate behind, rudimentary rays 10, well advanced, conspicuous; least depth of caudal peduncle 5; pectoral  $4 \frac{1}{5}$ ; ventral 4.

Length 370 mm. (Koehler.)

Eastern Atlantic.

Bathytroctes welshi new species

Depth  $4 \frac{3}{4}$ ; head  $2 \frac{3}{4}$ . width 4. Snout  $3 \frac{3}{4}$  in head from snout tip to eye; orbit  $3 \frac{1}{2}$ ; eye  $3 \frac{3}{4}$ ,  $1 \frac{1}{8}$  in snout, much greater than interorbital; maxillary reaches opposite hind eye edge, expansion  $1 \frac{3}{5}$  in eye, length  $2 \frac{1}{8}$

in head from snout tip; interorbital 7, low, broadly concave. Gill rakers 7 + 16, lanceolate, half of eye; gill filaments  $2/5$  of gill rakers.

Scales very caducous, all now fallen. Lateral line axial along side, complete to caudal base.

D. 18, rays low, all broken, fin base 2 in total head length; fin origin midway between beginning of lateral line and caudal base; A. 17, rays low, all broken, fin base 2 in total head length; caudal apparently forked, broken, rudimentary rays 8 or 9 above or below, moderate; least depth of caudal peduncle 8; pectoral very small, as now broken little less than pupil; ventral broken,  $1/2$  of orbit.

Head black. Iris slate black, pupil ivory white. Body brown, with dusky tinge. Fins brownish.

Diagnosis. Only the poorly preserved type known, distinguished by its large head.

Type No.

U.S.N.M.

3842. D. 5648. North Island (S.), N.  $87^{\circ}$  E., 10.2 miles (S.  $5^{\circ} 35'$  E.  $122^{\circ} 20'$ ), Buton Strait. In 559 fathoms. December 16, 1909. Length 76 mm. Type.

Bathytroctes antillarum (Goode and Bean)

Bathytroctes (Talismania) antillarum GOODE and BEAN, Oceanic Ichth., 1895, p.44. N.  $28^{\circ} 38' 30''$  W.  $87^{\circ} 2'$ , 420 fathoms, Gulf of Mexico.

Bathytroctes antillarum GOODE and BEAN, Oceanic Ichth., 1895, pl.14, fig.49, (type).

Talismania antillarum JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.1, 1896, p.455 (compiled).



Depth  $5 \frac{7}{8}$ ; head  $5 \frac{1}{4}$ , width 3. Snout  $3 \frac{1}{2}$  in head from snout tip to eye; orbit  $3 \frac{1}{4}$ ; eye 4,  $1 \frac{1}{4}$  in snout, twice interorbital; maxillary reach  $\frac{1}{5}$  in eye, expansion  $1 \frac{2}{3}$  in eye, length  $2 \frac{3}{5}$  in head; interorbital 2 in eye, very low, depressed, nearly level; opercle above with 2 keels, approximate above in front. Gill rakers  $7 \frac{1}{2}$  20, lanceolate, slender, 2 in eye or nearly 4 times gill filaments.

Scales 43 in lateral line to caudal base; 5 above, 5 below, 24 predorsal forward to occiput. Bases of vertical fins scaly. Median, well developed, moderate, trenchant predorsal keel nearly forward to occiput, though less marked anteriorly. Scales deciduous, all lost.

D. V, 13, I, rays broken, first branches ray  $2 \frac{4}{5}$  in total head length; A. IV, 16, I, first branched ray  $2 \frac{1}{4}$ , fin origin opposite dorsal origin; caudal damaged, apparently forked, rudimentary rays 10 above or below, moderate; least depth of caudal peduncle  $3 \frac{1}{2}$ ; pectoral  $2 \frac{1}{3}$ ; ventral  $2 \frac{4}{5}$  (?)

Head blackish. Iris neutral black, pupil ivory white. Inside gill opening and mouth blackish. Body rusty brown, dusky or neutral dusky on belly. Paired fins dark brown, vertical fin light, paler terminally.

Gulf of Mexico.

43739 U.S.N.M. N.  $28^{\circ} 38' 30''$  W.  $87^{\circ} 2'$ . In 420 fathoms.

Albatross Station 2394. March 13, 1885. Length 136 mm. Type.

Bathytroctes hataii new species

Depth 5 to  $5 \frac{1}{5}$ ; head  $3 \frac{1}{2}$  to  $3 \frac{2}{3}$ , width  $2 \frac{1}{2}$  to  $2 \frac{2}{3}$ . Snout  $3 \frac{1}{3}$  to  $3 \frac{2}{5}$  in head; eye  $3 \frac{1}{3}$  to 4, equals snout, twice or more width of interorbital; maxillary reaches  $\frac{1}{4}$  to  $\frac{1}{3}$  in eye, expansion 2 to  $2 \frac{1}{8}$  in eye, length  $2 \frac{3}{5}$  to  $2 \frac{2}{3}$  in head; interorbital  $2 \frac{1}{2}$  to  $2 \frac{4}{5}$ , concave,

narrow. Gill rakers 9 + 20, lanceolate, slender,  $2 \frac{1}{3}$  in eye; gill filaments  $\frac{1}{3}$  gill rakers.

Scales 45 or 46 in lateral line to caudal base; 7 above, 7 below, 29 or 30 predorsal forward to occiput. Only occiput scaly, rest of head naked. Vertical fin bases scaly. Scales with 12 or 13 basal radiating striae; circuli very fine.

D. VII or VIII, 12, I to 14, I, first branched ray 2 to  $2 \frac{1}{2}$  in head, fin origin opposite anal origin; A. III or IV, 16, I or 17, I, first branched ray  $2 \frac{1}{8}$  to  $2 \frac{3}{5}$ ; caudal  $1 \frac{1}{5}$  (?) to  $1 \frac{1}{2}$  (?), apparently well forked, rudimentary rays 14 or 15 above or below; least depth of caudal peduncle  $3 \frac{2}{5}$  to  $3 \frac{2}{3}$ ; pectoral  $1 \frac{4}{5}$  to  $2 \frac{1}{8}$ , reaches ventral; ventral 2 to  $2 \frac{2}{3}$ , inserted much nearer snout tip than caudal base.

Head largely dusky black to blackish. Iris slate black, pupil ivory white. Inside mouth and gill opening blackish. Body brown, belly tinged blackish. Fins dull brown.

Diagnosis. Resembles Bathytroctes antillarum (Goode and Bean) though with more gill rakers.

Type No.            U.S.N.M.

4304. D. 5667. Onkona Point, S.  $5^{\circ}$  W., 11 miles (S.  $2^{\circ}$   $56'$  E.  $118^{\circ} 47' 30''$ ), Macassar Strait. In 367 fathoms. December 29, 1909. Length 154 mm.

2254, 2256, 2257. D. 5463. Sialat Point Light, S.  $74^{\circ}$  E., 3.9 miles (N.  $13^{\circ} 40' 57''$  E.  $123^{\circ} 57' 45''$ ), east coast of Luzon. In 300 fathoms. June 16, 1909. Length 150 to 172 mm. Type largest example.

Bathytroctes aequatoris (Goode and Bean)

Bathytroctes (Talismania) aequatoris GOODE and BEAN, Oceanic Ichth., 1895, p.44. N. 1° 3' W. 80° 15', 741 fathoms, off Ecuador.

Bathytroctes aequatoris GOODE and BEAN, Oceanic Ichth., 1895, pl.14, fig.50 (type).

Talismania aequatoris JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.1, 1896, p. 456 (compiled).

Depth 5; head  $3 \frac{1}{5}$ , width  $2 \frac{3}{5}$ . Snout  $3 \frac{1}{3}$  in head from snout tip to eye; orbit  $4 \frac{3}{4}$ ; eye 7,  $2 \frac{1}{5}$  in snout,  $1 \frac{3}{4}$  in interorbital,  $1 \frac{1}{4}$  in bony interorbital; maxillary reaches slightly behind eye, expansion equals eye, length 2 in head from snout tip; interorbital  $4 \frac{3}{5}$ , bony interorbital  $5 \frac{3}{4}$ , low, with broad<sup>deep</sup> groove reaching occiput; opercle with oblique lines. Gill rakers 6 + 19, lanceolate, equal eye; gill filaments  $1 \frac{1}{5}$  in gill rakers.

Scales 46 tubular in lateral line to caudal base, which well marked with continuous deep groove. Scales very deciduous, all now fallen.

D. V, 16, rays broken, fin height 3 (?) in total head length; A. IV, 17, rays broken, fin height low; caudal damaged, evidently forked, rudimentary rays about 12, not prominent; least depth of caudal peduncle 5; pectoral small, low, damaged, apparently subequal with orbit; ventral about like pectoral, inserted little nearer mandible tip than caudal base. Head blackish, damaged, below lost skin whitish. Iris slate black, pupil whitish. Body blackish brown. Fins all pale. Inside mouth and gill opening blackish.

Eastern Pacific.

♂ 44085 U.S.N.M. N. 1° 3' W. 80° 15'. In 741 fathoms. Albatross  
Station 2793. Length 341 (?) mm.

In poor condition. Type.

Bathytroctes homopterus Vaillant

Bathytroctes homopterus VAILLANT, Exped. Travailleur et Talisman, Poiss., 1888, p.153, pl.12, figs. 1 a - b. Banc d' Arguin, 1113 meters.

Bathytroctes (Talismania) homopterus GOODE and BEAN, Oceanic Ichth., 1895, p.43, (copied). - NORMAN, Discovery Rep., vol.2, 1930, p.269, fig.2 (S.15 ° 55 ' E. 10 ° 35 ', 600 to 700 meters; N. 13 ° 25 ' W. 18 ° 22 ', 900 meters; type).

Depth 4 1/4; head 3 1/2. Snout 3 2/5 in head from snout tip; eye 3 1/8, little greater than eye, equals interorbital; maxillary reaches 1/2 or little beyond in eye, expansion 3 in eye, length 2 in head from snout tip; premaxillary somewhat protruding, bearing 2 or 3 forwardly directed teeth anteriorly, <sup>more prominent in young,</sup> inner longest, followed by series of smaller conical teeth; maxillary toothed; opercle above with series of diverging ridges ending in feeble pointed projections; pointed membranous process above clavicle. Lower gill rakers 20.

Scales 65 to 75 in lateral line; 13 above, 13 below.

D. 18 to 20, fin height 3 2/5 in total head length; A. 16 to 18, origin about opposite first eighth of dorsal base, fin height 5 1/8; caudal 1 1/3, deeply forked; least depth of caudal peduncle 3 1/8; pectoral 2; ventral 4 7/8. Length 47 to 100 mm. (Norman.)

Atlantic Ocean. The type was 161 mm.

Subgenus BATHYTROCTES Günther

Bathytroctes zugmayeri ~~new species~~ <sup>new species</sup>

<sup>#</sup> Depth 5; head 2 3/5, width 2 3/5. Snout 4 1/5 in head from snout tip; <sup>#</sup> eye 3 1/6, greater than snout or interorbital; maxillary reaches 4/5 in eye,

expansion 2 in eye, length  $1 \frac{9}{10}$  in head from snout tip; bony interorbital  $2 \frac{1}{2}$ ; opercle with dozen radiating striae. Gill rakers  $10 + 20$  (?), slender, lanceolate, nearly 4 times gill filaments or  $1 \frac{2}{5}$  in eye.

Scales 58 (?) in lateral line to caudal base; 7 above, 7 below, 34 (?) predorsal forward to occiput. Head naked. Scales apparently on bases of vertical fins. Scales very caducous, most all fallen. Lateral line axial along side of body.

D. III, 13, I, third branched ray  $2 \frac{2}{5}$  in total head length, fin origin midway between upper clef of gill opening and caudal base; A. III, 10, I, third ray  $2 \frac{1}{4}$ , fin origin opposite base of tenth dorsal ray; caudal  $1 \frac{1}{3}$  (?) forked, rudimentary rays 5 or 6 (?) above or below, inconspicuous; least depth of caudal peduncle  $3 \frac{1}{4}$ ; pectoral  $1 \frac{1}{4}$ , uppermost branched ray longest and slender; ventral evidently lost.

Head blackish brown. Iris black, pupil ivory white. Inside mouth and gill opening black. Body dark brown. Fins brown.

Diagnosis. Allied with Bathytroctes squamulosus Alcock but with larger maxillary as in that species it only reaches about opposite middle of eye. My specimen also shows a more advanced anal. Its character of affiliation seems to be its long pectoral. Bathytroctes squamulosus shows a more forward vent, which about opposite middle of dorsal base while my species shows it about last  $\frac{2}{5}$  of dorsal base and close before anal fin origin.

Type No. U.S.N.M.

10231. D. 5654. Cape Tabako, N.  $17^{\circ}$  E., 21.5 miles (S.  $3^{\circ}42'$  E.  $120^{\circ}45'50''$ ), Gulf of Boni, Celebes. In 805 fathoms. December 18, 1909. Length 235 mm. Type.

Bathytroctes harperi new species.

Depth  $4 \frac{1}{2}$  to  $5 \frac{1}{5}$ ; head  $2 \frac{7}{8}$  to  $3 \frac{1}{4}$ , width  $2 \frac{1}{3}$  to  $2 \frac{3}{4}$ .

Snout  $3 \frac{1}{4}$  to  $4 \frac{1}{3}$  in head from snout tip to eye; orbit  $4 \frac{1}{3}$  to 5; eye  $4 \frac{3}{4}$  to 6,  $1 \frac{1}{2}$  to 2 in snout, slightly greater than interorbital in young to  $1 \frac{1}{8}$  in interorbital with age; maxillary reaches opposite or little beyond hind eye edge, expansion 1 to  $1 \frac{1}{5}$  in eye, length  $1 \frac{7}{8}$  to 2 in head from snout tip; mandible ends in front with short spur somewhat projecting downward; interorbital  $5 \frac{3}{5}$  to 6, level in front to slightly concave behind. Gill rakers 7 + 17, lanceolate, compressed, equal eye or 3 times gill filaments.

Scales 50 in lateral line to caudal base, mostly damaged. Scales not evident, skin with fine parallel longitudinal striae.

D. VI, 13, I, first branched ray  $2 \frac{4}{5}$  (?) in total head length; A. III, 7, I, third branched ray  $2 \frac{2}{3}$ . fin origin rather close behind dorsal origin; caudal  $1 \frac{4}{5}$ , deeply forked, ends in slender pointed lobes, 12 rudimentary rays above and below, inconspicuous, apparently not extending forward over  $\frac{3}{5}$  of extent of caudal peduncle to hind depressed tips of dorsal and anal; least depth of caudal peduncle  $5 \frac{4}{5}$ ; pectoral  $5 \frac{1}{5}$ ; ventral  $4 \frac{2}{5}$ .

Head blackish brown to black. Iris neutral black, pupil ivory white. Body dark seal brown. Fins dusky or blackish.

Diagnosis. Related to Rouleina nudus (BRAUER) but differs in the greatly smaller eye, conspicuously broader maxillary and shorter paired fins. Compared with Brauer's figure the dorsal and anal bases are shown  $1 \frac{2}{5}$  to  $1 \frac{1}{3}$  in space posteriorly or to caudal base, whereas in my specimens they are about equal. Most of my materials are poorly preserved so that it is impossible to render complete details in any of the specimens.

Type No. U.S.N.M.

For Dr. Francis Harper now of Philadelphia, to whom I am indebted for various natural history details.

D. 5610. Batu Daka Island (S.), N.  $87^{\circ}$  W., 20.9 miles (S.  $0^{\circ}$   $36'$  E.  $122^{\circ}$   $11'$ ), Gulf of Tomini, Celebes. In 678 fathoms. November 19, 1909. Length 332 mm.

3983. D. 5660. Cape Lassa, S.  $88^{\circ}$  W., 20.5 miles (S.  $5^{\circ}$   $36'$   $30''$  E.  $120^{\circ}$   $49'$ ), Flores Sea. In 692 fathoms. December 20, 1909. Length 280 (?) mm. In poor preservation.

1582, 3809, 3981, 3982, 4230. D. 5655. Cape Tabako, N.  $7^{\circ}$  E., 13 miles (S.  $3^{\circ}$   $34'$   $10''$  E.  $120^{\circ}$   $50'$   $30''$ ), Gulf of Boni, Celebes. In 608 fathoms. December 18, 1909. Length 250 to 270 mm. Type, smallest specimen.

4093. D. 5656. Olang Point, N.  $67^{\circ}$  W., 14.5 miles (S.  $3^{\circ}$   $17'$   $40''$  E.  $120^{\circ}$   $36'$   $45''$ ), Gulf of Boni, Celebes. In 484 fathoms. December 19, 1909. Length 238 (?) mm.

2255. D. 5463. Sialat Point Light, S.  $74^{\circ}$  E., 3.9 miles (N.  $13^{\circ}$   $40'$   $57''$  E.  $123^{\circ}$   $57'$   $45''$ ), east coast of Luzon. In 300 fathoms. June 16, 1909. Length 177 mm.

Bathytroctes burragei (Townsend and Nichols)

Bajacalifornia burragei TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist., New York, vol.52, 1925, p.8, fig.3. Off Todos Santos Bay, Lower California, 590 fathoms.

Depth 6; head 3, width 3. Snout  $3 \frac{1}{3}$  in head from snout tip; eye

3 1/2, equals snout, greatly exceeds interorbital; maxillary reaches 2/5 in eye, expansion 1 7/8 in eye, length 2 1/6 in head from snout tip; interorbital very narrow, level, 2 1/2 in eye; opercle with 2 strong oblique keels radiating from upper front portion. Gill rakers 9 - 25, lanceolate, slender, 1 2/3 in eye; gill filaments 2/5 of gill rakers.

Scales 50 in lateral line to caudal base; 5 above, 5 below, 30 predorsal forward to occiput. Scales very caducous, all fallen, apparently present on caudal base.

D. 15, rays apparently short, all now broken, fin origin nearly midway between hind preopercle edge and caudal base, fin base 2 1/8 in total head length; A. 11, rays broken, appear short, fin origin at last 2/5 in dorsal base, fin base 2 3/5 in total head length; caudal broken, apparently forked, rudimentary rays 9 above or below, little prominent; least depth of caudal peduncle 5 1/8; pectoral 3 1/5 (?), short; ventral 3 1/2, inserted little nearer front eye edge than caudal base.

Head black. Eye neutral black. Inside mouth and gill opening black. Body dusky or dark blackish brown, especially belly. Fins brownish.

Off Lower California.

87553 U.S.N.M.

In 590 fathoms. Albatross Station 5674. March 8, 1911. Length 125 mm.

Type.

Bathytroctes alvifrons Garman

Bathytroctes alvifrons GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.286,

pl.58, figs.2 - a. N. 6 ° 21 ' W. 80 ° 41 ', 1793 fathoms; N. 2 ° 34

' W. 92 ° 6 ', 1360 fathoms, Gulf of Panama.



Depth  $5 \frac{1}{4}$ ; head 3. Snout to eye  $3 \frac{1}{8}$  in head; eye  $5 \frac{1}{8}$ , orbit 4, eye  $1 \frac{3}{5}$  in snout, twice interorbital; maxillary reaches hind eye edge, expansion 2 in eye, length  $2 \frac{1}{5}$  in head; teeth small, slender, uniserial on premaxillaries, maxillaries, dentaries, and palatines, 1 to several each side of vomer; interorbital depressed. Gill rakers slender, less than half eye.

Scales 44 in lateral line; 4 above, 4 below.

D. 13 or 14, fin base  $2 \frac{1}{4}$  in head and most all before anal; A. 11 or 12, fin base  $3 \frac{2}{5}$ ; caudal damaged, deeply emarginate; least depth of caudal peduncle  $3 \frac{2}{3}$ ; paired fins damaged, both evidently small.

Black outside and on linings of body cavities. Length 230 mm. (Garman.)  
Gulf of Panama.

Bathytroctes inspector Garman

Bathytroctes inspector GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.288,  
pl.M, fig.1. N.  $6^{\circ} 10'$  W.  $83^{\circ} 6'$ , 1471 fathoms.

Depth  $4 \frac{7}{8}$ ; head  $3 \frac{1}{3}$ , width  $2 \frac{2}{5}$ . Snout  $3 \frac{2}{3}$  in head to eye; orbit  $2 \frac{3}{5}$ ; eye  $3 \frac{7}{8}$ , equals snout, greater than interorbital; maxillary reaches opposite hind eye edge, expansion  $2 \frac{2}{5}$  in eye, length 2 in head; jaws equal; bony interorbital (damaged) about  $2 \frac{2}{3}$  (?) in eye. Gill rakers 5 - 15, lanceolate,  $\frac{1}{2}$  of eye or twice gill filaments.

Scales 47 in lateral line to caudal base; 5 above, 6 below, 24 predorsal forward to occiput. No scales now remaining in lateral line, which apparently axial along side of body. Scales all very caducous, most all fallen, thin, cycloid.

D. III, 12, I, origin little behind ventral origin or nearly midway between upper cleft of gill opening and caudal base, fin height about equals eye; A. III, 8, I, inserted behind dorsal base, fin height like dorsal; caudal damaged, emarginate, rudimentary rays 7 or 8 above or below; least depth of caudal peduncle  $3 \frac{3}{4}$ ; pectoral 3; ventral 3, inserted midway between hind eye edge and caudal base.

Head black. Iris blackish, pupil ivory white. Body brown, fins all dusky. Inside mouth and gill opening black.

Gulf of Panama. Garman only mentions "a female ten inches in length" and Station 3361.

57894 U.S.N.M. N.  $6^{\circ} 10'$  W.  $83^{\circ} 6'$ . In 147 fathoms. Albatross Station 3361. February 25, 1891. Museum of Comparative Zoology. Length 285 (?) mm. Very poorly preserved.

Bathytroctes macrolepis Günther

Bathytroctes macrolepis GÜNTHER, Rep. Voy. Challenger, vol. 22, 1887, p.225, pl.57,

fig. B. (head), North of Celebes (N. Lat.  $2^{\circ} 55'$  E. Long.  $124^{\circ} 53'$ )

in 2150 fathoms. - GOODE and BEAN, Oceanic Ichth., 1895, p.41, (not pl.

12, fig.44) (compiled). - ? ALCOCK, Cat. Deep. Sea Fishes Indian Mus.,

1899, p. 174 (Andaman Sea). - WEBER and BEAUFORT, Fishes Indo- Austral.

Archipelago, vol.2, 1913, p. 103 (copied).

Depth  $4 \frac{3}{4}$ ; head  $3 \frac{3}{4}$ , width  $2 \frac{1}{5}$ . Snout 4 in head from snout tip to eye; orbit  $2 \frac{3}{4}$ ; eye  $3 \frac{3}{5}$ , greater than snout or interorbital; maxillary reaches  $\frac{2}{3}$  in eye or opposite hind pupil edge, expansion  $1 \frac{7}{8}$  in eye, length 2 in head from snout tip; interorbital  $6 \frac{1}{2}$ , concave like cranium.

Gill rakers 9 + 19, lanceolate,  $1 \frac{4}{5}$  in eye, gill filaments  $\frac{2}{5}$  of gill rakers.

Scales 53 in lateral line to caudal base; 7 above, 7 below, 27 predorsal forward to occiput. Bases of vertical fins scaly. Head largely scaly. Lateral line axial along side of body, complete, large tubes conspicuous. each well exposed. Scales all very thin, cycloid, caducous, most all fallen.

D. V, 11, I, fin origin nearly midway between hind edge and caudal base, third branched ray  $1 \frac{4}{5}$  in total head length; A. III, 13, I, fourth branched ray 2, origin about opposite last fourth of dorsal base; caudal  $1 \frac{1}{4}$ , deeply forked, slender lobes pointed, 7 to 9 rudimentary rays above or below; least depth of caudal peduncle  $2 \frac{4}{5}$ ; pectoral  $1 \frac{3}{5}$ , reaches  $\frac{1}{8}$  to ventral; ventral reaches  $\frac{4}{5}$  to anal, length  $1 \frac{3}{5}$  in total head length, fin origin slightly nearer anal than pectoral origin.

Head blackish brown. Iris neutral black, pupil ivory white. Body brown. Fins all slightly paler brown than body. Inside gill opening and mouth blackish.

Andaman Sea (?), East Indies. My specimen agrees with Günther's figure of the head.

4233. D. 5655. Cape Tabako, N.  $7^{\circ}$  E., 13 miles (S.  $3^{\circ} 34'$   $10''$  E.  $120^{\circ} 50' 30''$ ), Gulf of Boni, Celebes. In 608 fathoms.  
December 18, 1909. Length 188 mm.

Bathytroctes calcaratus Weber

Bathytroctes calcaratus WEBER, Siboga Exped., vol.57, Fische, 1913, p.11, pl.4, fig.5 - a. Macassar Strait (S. Lat.  $85^{\circ}$  East Long.  $119^{\circ} 29.5'$ ), in 724 meters; Ceram Sea (S. Lat.  $173, 3^{\circ} 27'$  East Long.  $131^{\circ} 5'$ ), in 567 meters. - WEBER and BEAUFORT, Fishes Indo. Austral. Archipelago, vol.2, 1913, p.102, fig.35 (type).

Depth  $5 \frac{1}{2}$ ; head  $3 \frac{1}{3}$ , width  $2 \frac{3}{5}$ . Snout 3 in head from snout tip; eye  $5 \frac{4}{5}$ ,  $1 \frac{4}{5}$  in snout, equals interorbital; maxillary reaches opposite hind eye edge, expansion  $1 \frac{2}{5}$  in eye, length 2 in head from snout tip; mandible with terminal downward directed spine or spur; interorbital  $5 \frac{4}{5}$ , with deeply concave median area extending to occiput; opercle with numerous fine radiating striae. Gill rakers  $6 + 18$ , lanceolate,  $1 \frac{1}{4}$  in eye, twice gill filaments.

Scales 58 in lateral line to caudal base; 9 above, 8 below, 40 predorsal forward to occiput. Bases of vertical fins finely scaled. Scales with circuli mainly as minute, parallel, very numerous, largely longitudinal striae, over all many irregular circular ridges or grooves, greatly suggestive of lines on outer surface of clam shell.

D. V, 12, I, first branched ray  $2 \frac{1}{2}$  in total head length, fin origin midway between upper inner edge of gill cleft and caudal base; A. IV, 11, I, second branched ray  $2 \frac{2}{5}$ , fin origin opposite middle of dorsal base; caudal  $1 \frac{3}{5}(?)$ , forked, 13 to 15 moderate rudimentary rays above or below; least depth of caudal peduncle  $3 \frac{7}{8}$ ; pectoral  $2 \frac{4}{5}$ , reaches about  $2 \frac{3}{4}$  to ventral; ventral inserted midway between caudal base and snout tip, reaches  $1 \frac{4}{5}$  to anal, length  $2 \frac{4}{5}$  in total head length.

Head blackish. Iris slate black, pupil ivory white. Inside mouth and gill opening blackish. Body dark brown, scale pockets with dusky and belly tinged blackish. Fins brownish, with dusky tints.

East Indies. My example agrees with Weber's crude figure largely, though it does not show the breast so finely scaled.

10070. D. 5284. Malavatuan Island (S.), N.  $46^{\circ}$  W., 14. 25 miles (N.  $13^{\circ} 42' 05''$  E.  $120^{\circ} 30' 45''$ ), China Sea vicinity of southern Luzon. In 422 fathoms. July 20, 1908. Length 245 (?) mm.

Bathytroctes squamosus Alcock

Bathytroctes squamosus ALCOCK, Ann. Mag. Nat. Hist. series 6, vol.6, 1890, p.300. About 75 miles west of Goa Coast, Laccadive Sea (N. Lat.  $15^{\circ} 2'$  E. Long.  $72^{\circ} 34'$ ), in 740 fathoms; Illustrat. Zool. Investigator, pt.1, 1892, pl.5, fig.1. - GOODE and BEAN, Oceanic Ichth., 1895, p.40 (reference). - ALCOCK, 1896, p. 334 (Off Goa coast in 740 fathoms); Cat. Deep-Sea Fishes Indian Mus., 1899, p.173 (Arabian Sea off the Laccadives, 740 fathoms). - WEBER, Siboga Exped., vol.57, Fische, 1913, p.11, (Bali Sea in 1018 meters). - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.101 (Bali Sea).

Depth 4; head  $3\frac{1}{2}$ . Snout  $4\frac{1}{3}$  in head from snout tip; eye  $2\frac{2}{3}$ , greater than snout; maxillary reaches  $\frac{1}{2}$  in eye, expansion  $2\frac{1}{3}$  in eye, length  $2\frac{1}{3}$  in head from snout tip; teeth small, even, acute, uniserial, recurved in premaxillaries, dentaries, vomer and palatines, procurved on maxillaries; nostrils large, close before eye. Gill rakers long, close set.

Scales 50 in lateral line; 7 above, 7 below. Fins not scaly, except caudal base.

D. IV, 14, first branched ray  $2\frac{1}{8}$  in total head length, most all of base before anal; A. III, 15, first branched ray  $3\frac{1}{8}$ ; caudal  $1\frac{1}{4}$ , deeply forked; least depth of caudal peduncle  $2\frac{1}{2}$ ; pectoral  $1\frac{2}{5}$ ; ventral  $2\frac{2}{3}$ .

Head deep black. Buccal membrane and peritoneum black. Body pinkish

brown. Fins transparent gray. Length 258 mm. (Alcock.)

Indian and Pacific Oceans.

Bathytroctes grimaldi Zugmayer

Bathytroctes grimaldi ZUGMAYER, Bull. Inst. Océanogr. Monaco, No. 193, Jan. 20, 1911, p.1. N. 37° 38' W. 10° 53', 4900 meters, off Portugal; Rés. Camp. Sci. Monaco, vol.35, 1911, p.6, pl.1, fig.2 (type).

Depth  $4 \frac{3}{4}$ ; head  $3 \frac{1}{3}$ . Snout 4 in head from snout tip; eye  $3 \frac{1}{8}$ , greater than snout; maxillary reaches  $\frac{3}{4}$  in eye, expansion 2 in eye, length  $1 \frac{9}{10}$  in head from snout tip; mandible slightly protrudes, teeth very small, uniserial, on premaxillaries, maxillaries and dentaries, and group anteriorly on palatines; interorbital low.

Scales 75 in lateral line; 8 above, 8 below. Caudal base scaly.

D. 13, origin slightly nearer ventral than anal origin, first ray  $2 \frac{4}{5}$  in total head length; A. 11, origin opposite middle of dorsal base, fin height  $3 \frac{2}{3}$ ; caudal  $1 \frac{7}{8}$ , well forked; least depth of caudal peduncle 3; pectoral  $1 \frac{3}{4}$ , reaches ventral; ventral  $1 \frac{9}{10}$ .

Black, head violet black. Length 165 mm. (Zugmayer.)

Eastern Atlantic.

Bathytroctes melanocephalus Vaillant

Bathytroctes melanocephalus VAILLANT, Expéd. Sci. Travailleur et Talisman,

Poiss., 1888, p. 155, pl.11, figs.3, a - b. Coasts of Morocco, 2200 to 2600 meters; coasts of Soudan, 1435 meters, Banc d'Arguin, 1617 meters. GOODE and BEAN,

Oceanic Ichth., 1895, p.43 (compiled).

\* Depth  $5 \frac{1}{5}$ ; head  $2 \frac{7}{8}$ . Snout 3 in head from snout tip; eye 6, #

2 in snout; maxillary reaches slightly beyond eye, expansion 1 2.5 in eye, length 1 4/5 in head from snout tip; premaxillary teeth elongate, fine, conic, uniserial; opercle with 7 radiating ridges above extended down posteriorly.

Scales 105 in lateral line; tubes 64 in lateral line; 13 above, 10 below to anal.

D. 14, fin height 4 7/8 in total head, fin base entirely before anal origin; A. 11, fin height 4 1/2; caudal 1 4/5, slightly emarginate; least depth of caudal peduncle 3 3/4; pectoral 4 4/5; ventral 4 4/5.

Grayish green. Head deep blue black. Iris blue gray, pupil black. Length 108 mm. (Vaillant.)

Eastern Atlantic.

Bathytroctes alveatus Garman

Bathytroctes alveatus GARMAN, Mem. Mus. Comp. Zool., vol. 24, 1899, p. 287, pl. 58, fig. 1, N. 3° 9' W. 82° 8', 1132 fathoms; S. 0° 36' W. 86° 46', 1322 fathoms, Gulf of Panama.

Depth 5; head 2 3/4. Snout to eye 2 9/10 in head from snout tip; orbit 5 1/6; eye 7, 2 2/5 in snout, wide as interorbital; maxillary reaches slightly behind orbit, expansion equals eye, length 1 4/5 in head from snout tip; teeth small, rather strong, subconic, hooked, uniserial in premaxillaries, maxillaries, dentaries and palatines, 1 to 3 fang like teeth each side of vomer; interorbital low. Gill rakers 5 + 16, slender, 3/4 eye.

Scales 70 in lateral line; 10 above, 10 below.

D. 15 or 16, fin height 5 in head, fin base entirely before anal; A. 11, fin height 5; caudal 2, well emarginate; least depth of caudal peduncle  $4 \frac{4}{5}$ ; pectoral 3; ventral  $3 \frac{2}{5}$ .

Surface and interior linings black. Length 191 mm. (Garman.)

Gulf of Panama.

Bathytroctes stomias (Gilbert)

Bathytroctes stomias GILBERT, Proc. U.S. Nat. Mus., vol. 13, 1890, p. 53. Albatross

Station 3074, 877 fathoms, off Oregon. - GOODE and BEAN, Oceanic Ichth., 1895, p. 40 (reference). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No. 47, pt. 1, 1896, p. 454 (compiled).

Narcetes stomias TOWNSEND and NICHOLS, Bull. Amer. Mus. Nat. Hist., New York, vol. 52, art. 1, May 16, 1925, p. 10 (southwest of San Diego, 1076 fathoms).

Depth  $5 \frac{1}{8}$  to  $5 \frac{1}{5}$ ; head  $3 \frac{1}{2}$  to  $5 \frac{1}{4}$ , width  $2 \frac{3}{4}$  to  $2 \frac{4}{5}$ . Snout  $3 \frac{1}{3}$  to  $3 \frac{7}{8}$  in head as measured to eye; orbit  $3 \frac{3}{4}$ ; eye  $5 \frac{7}{8}$  to  $6 \frac{2}{3}$ ,  $1 \frac{2}{3}$  to 2 in snout,  $1 \frac{1}{3}$  to  $1 \frac{2}{5}$  in interorbital, subequal with bony interorbital; maxillary reaches  $\frac{3}{4}$  to  $\frac{4}{5}$  eye diameters behind eye, expansion  $1 \frac{1}{5}$  to  $1 \frac{1}{4}$  in eye, length  $1 \frac{3}{4}$  to  $1 \frac{4}{5}$  in head; interorbital  $4 \frac{7}{8}$  to 5, low to depressed, with broad deep groove extending on cranium nearly to occiput, bony interorbital  $7 \frac{1}{5}$ . Gill rakers 5 + 12, lanceolate, 1 to  $1 \frac{2}{3}$  in eye; gill filaments  $\frac{1}{3}$  to  $\frac{2}{5}$  of gill rakers.

Scales 85 to 95 along close above lateral line to caudal base; tubes 60 in lateral line to caudal base and 3 more on latter; 8 to 10 above, 9 to 11 below, 55 to 65 predorsal forward to occiput. Bases of vertical fins with rather small scales. Scales very caducous, all fallen. <sup>H</sup>head naked.



(D. III, 16, I or III, 17, I, first branched ray  $3 \frac{1}{2}$  (?) in head, fin origin midway between gill opening and caudal base; A. III, 12, I or III, 13, I, first branched ray  $4 \frac{2}{5}$  (?), fin origin opposite first to last  $\frac{2}{5}$  of dorsal fin base; caudal broken, forked, rudimentary ray 12 to 14 above or below; least depth of caudal peduncle  $3 \frac{3}{5}$  (?), inserted little before dorsal or midway between hind maxillary end and caudal base.

Head black. Body dark sienna brown, scale pockets dusky to blackish. Body sometimes tan brown, sooty about head and breast, Iris neutral dusky to blackish, pupil ivory white. Inside mouth and gill opening blackish. Fins brownish to dusky.

Off California and Oregon.

35594 U.S.N.M. N.  $39^{\circ} 43' 30''$  W.  $69^{\circ} 23'$ . In 1050 fathoms.

Albatross Station 2220. August 23, 1884. Length 510 mm.

43081 U.S.N.M. N.  $47^{\circ} 22'$  W.  $25^{\circ} 48' 30''$ . In 877 fathoms.

Albatross Station 3074. June 29, 1889. Length 318 mm. Type.

Bathytroctes rostratus Günther

Bathytroctes rostratus GÜNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, 1878, p.250. Off Pernambuco, Brazil, in 675 fathoms; Rep. Voy. Challenger, vol.22, 1887, p.227, pl.58, fig. B (type). - GOODE and BEAN, Oceanic Ichth., 1895, p.41 (copied). - BRAUER, Deutsch Tiefsee Exped. Valdivia, vol. 15, Tiefsee -Fische, 1906, p.17, pl.14, figs.2 - 3 (off Diego Garcia, between Seychelles and Zanzibar, Gulf of Aden, 200 to 1500 meters). - HOLT and BYRNE, Dep. Agric. Ireland Fisher. Sci. Invest., 1905 (1906), No.2, p.45, pl.4, figs. 3 - 5. - ZUGMAYER, Rés. Camp. Sci. Inst. Monaco, vol. 35, 1911, p.5 (N.  $43^{\circ} 4'$  W.  $19^{\circ} 42'$ , 1500 meters, between Portugal

Azores). - HJORT, Depths of the Ocean, 1912, p.394 (off Morocco; Azores; 3239 meters).

Bathytroctes (Bathytroctes) rostratus NORMAN, Discovery Rep., vol.2, 1930, p.268, pl.2, fig.3, text fig 1 (S.  $33^{\circ} 25'$  E.  $6^{\circ} 31'$ , 1000 meters; S.  $33^{\circ} 50'$  to  $34^{\circ} 13'$  E.  $16^{\circ} 4'$  to  $15^{\circ} 49'$ , 350 to 450 meters).

Bathytroctes poroseopus BRAUER, Verhand. Deutsch. Zool. Gesell., vol.12, 1902, p.43.

Depth  $4 \frac{1}{8}$  to  $5 \frac{1}{4}$ ; head  $3 \frac{1}{2}$  to  $3 \frac{3}{4}$ , width  $2 \frac{1}{4}$  to  $2 \frac{4}{5}$ . Snout to eye  $3 \frac{7}{8}$  to 4 in head; orbit 3 to  $3 \frac{1}{8}$ ; eye  $3 \frac{7}{8}$  to  $4 \frac{1}{4}$ , equals snout, greater than interorbital; maxillary reaches opposite hind eye edge but not to hind orbital edge, expansion  $1 \frac{4}{5}$  to  $2 \frac{1}{4}$  in eye, length  $1 \frac{7}{8}$  to 2 in head; interorbital  $4 \frac{3}{5}$  to  $4 \frac{3}{4}$ , broadly concave; opercle with oblique stria. Gill rakers  $10 + 25$ , lanceolate, slender,  $1 \frac{1}{2}$  in eye; gill filaments  $\frac{3}{5}$  gill rakers.

Scales 80 along and close above lateral line to caudal base; 12 above, 14 below, 50 predorsal. Bases of vertical fins scaly. Head naked. Scales adherent, uniform; circuli fine and converge in 2 groups basally.

D. IV, 16, I, origin little before anal origin, third branched ray  $2 \frac{1}{5}$  to  $2 \frac{1}{2}$ ; caudal  $1 \frac{1}{3}$  to  $1 \frac{1}{2}$ , well forked, rudimentary rays 10 above or below, moderate; least depth of caudal peduncle  $2 \frac{1}{2}$  to  $2 \frac{3}{5}$ ; pectoral 4; ventral  $2 \frac{1}{5}$  to  $2 \frac{1}{2}$ .

Head black. Iris black, pupil ivory white. Body brown, more or less dark to sooty about belly, especially anteriorly. Inside mouth and gill openings blackish. Fins brownish.

Atlantic, Indian and Pacific Oceans. Easily known by the pair of anterior

denticles at the front of the snout, rather wide set and directed forward.

4445. D. 5525. Balicasag Island (C.), N.  $11^{\circ}$  W., 18.2 miles (N.  $9^{\circ} 12' 30''$  E.  $123^{\circ} 44' 7''$ ), between Siquijor and Bohol. In 405 fathoms. August 11, 1909. Length 130 mm.

4343 to 4345, 4488. D. 5497. Bantigui Island, N.  $64^{\circ}$  W., 10 miles (N.  $9^{\circ} 7' 15''$  E.  $124^{\circ} 59' 30''$ ), between Leyte and Mindanao. In 960 fathoms. August 3, 1909. Length 78 to 116 mm.

5728. D. 5507. Camp Overton Light, Iligan Bay (Mindanao), S.  $1^{\circ}$  E., 8.6 miles (N.  $8^{\circ} 21' 12''$  E.  $124^{\circ} 12' 6''$ ), northern Mindanao and vicinity. In 425 fathoms. August 5, 1909. Length 76 mm.

D. 5544. Coronado Point, S.  $37^{\circ}$  W., 21.5 miles (N.  $8^{\circ} 16' 30''$  E.  $122^{\circ} 20' 30''$ ), northern Mindanao and vicinity. In 759 fathoms. September 6, 1909. Length 58 mm.

4337 and 4338. D. 5337. Observatory Island (N.), S.  $80^{\circ}$  E., 13.8 miles (N.  $11^{\circ} 34'$  E.  $119^{\circ} 26'$ ), Palawan Passage. In 43 fathoms. December 20, 1908. Length 110 mm. 2 examples.

Bathytroctes microlepis Günther

Bathytroctes microlepis GÜNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, 1878, p.249. Southeast off Cape St. Vincent, in 1090 fathoms (Atlantic); Rep. Voy. Challenger, vol.22, 1887, p.226, pl.57, fig. A (type). - ? ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.4, 1889, p. 452 (Andaman Sea in 500 fathoms). - GOODE and BEAN, Oceanic Ichth., 1895, pp. 42, 510 (compiled). - ALCOCK, Journ. Asiatic Soc. Bengal, vol. 65, pt.2, 1896, p.334 (compiled); Cat. Deep - Sea Fishes Indian Mus., 1899, p.174 (copied).

Bathytroctes macrolepis (not Günther) GOODE and BEAN; Oceanic Ichth., 1895,  
pl.12, fig.44 (wrongly transposed).

Depth 5; head  $3 \frac{3}{5}$ , width 3. Snout  $3 \frac{9}{10}$  in head from snout tip; eye  $3 \frac{1}{10}$ , greater than snout or interorbital; maxillary reaches  $\frac{7}{8}$  in eye, expansion  $2 \frac{1}{4}$  in eye, length 2 in head from snout tip; lower jaw slightly protrudes; teeth feeble, minute, uniserial, in jaws, on vomer and palatines; interorbital  $6 \frac{3}{4}$ , low. Gill rakers 11 + 24, lanceolate, long.

Scales 70 in lateral line; 9 above, 11 below. Fins scaleless.

D. III, 12, first branched ray  $2 \frac{1}{6}$  in total head length; A. III, 15, first branched ray  $1 \frac{9}{10}$ , fin origin near last fourth of dorsal fin base; caudal  $1 \frac{3}{5}$ , well emarginate, rudimentary rays numerous and prominent, least depth of caudal peduncle  $3 \frac{2}{5}$ ; pectoral  $1 \frac{2}{3}$ ; ventral  $2 \frac{1}{5}$ .

Uniform black. Length 255 mm. (Günther)

Atlantic and Indian (?) Oceans.

NEMABATHYTROCTES new subgenus

Type - Bathytroctes longifilis Brauer

Head very large,  $2 \frac{2}{5}$  to caudal. Maxillary reaches slightly behind eye. Scales 100. Dorsal origin slightly before anal origin. Caudal lobes end in long points. Pectoral with long filamentous ray reaching caudal.

Diagnosis. Known by its extended caudal and pectoral filamentous rays.

(Νηψα, thread; Bathytroctes.)

Bathytroctes longifilis Brauer

Bathytroctes longifilis BRAUER, Zool. Anzeiger, vol.25, No.668, 1902, p. 277.

Gulf of Aden (N. Lat.  $13^{\circ} 2' 8''$  East Long.  $46^{\circ} 41' 6''$ ), in 1469 meters; Deutsch. Tiefsee Exp. Valdivia, vol.15, Tiefsee - Fische, 1906, p.18, pl.14, fig.4 (type).

Depth  $4 \frac{2}{5}$ ; head  $2 \frac{2}{5}$ . Snout  $3 \frac{1}{5}$  in head; eye  $5 \frac{1}{8}$ ,  $1 \frac{2}{3}$  in snout; maxillary reaches slightly behind eye, expansion  $2 \frac{1}{5}$  in eye, length  $1 \frac{9}{10}$  in head; minute teeth uniserial in jaws, on vomer and palatines; inter-orbital low.

Scales 100 in lateral line; 17 above, 20 below. Fins scaleless.

D. 21, origin slightly before anal origin, fin height  $2 \frac{9}{10}$  in head; A.22, fin height  $2 \frac{3}{5}$ ; caudal deeply lunate, lobes ending in long slender points, fin length  $2 \frac{4}{5}$  in rest of body; least depth of caudal peduncle 5 in head; pectoral with long filamentous ray extended little beyond caudal base, fin length otherwise  $2 \frac{1}{2}$  in head; ventral  $2 \frac{1}{3}$ .

Gray brown, belly somewhat darker. Head blackish, with bluish sheen above. Eye dark blue. Fins gray, ventral darker, long pectoral filament pale. Length 117 mm. (Brauer.)

Gulf of Aden.

#### Genus NARCETES Alcock

Narcetes ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.6, 1890, p.305. Type

Narcetes grimelas ALCOCK, monotypic.

Body elongate, usually rather slender, compressed. Head large. Eye moderate or small. Mouth wide, jaws nearly equal. Maxillary reaches from middle of eye to beyond <sup>hind</sup> eye edge. Fine teeth on premaxillaries, dentaries, maxillaries, palatines and vomer, pluriserial on first two and none on tongue. Gill openings

wide. Gill membranes united. Gill rakers long. Branchiostegals 7. Pseudo-branchiae present. Pyloric coeca moderate. Dorsal postmedian, its origin well before anal origin. Caudal forked. Paired fins long or short.

The inclusion of several new forms considerably widen the range of variation as now understood.

#### ANALYSIS OF SPECIES.

- <sup>1</sup>  
a. Narcetes. Vent posterior to dorsal origin or close before anal.
- <sup>1</sup>  
b. Scales large, 45 to 50 in lateral line.
- <sup>1</sup>  
<sup>2</sup>  
c. Maxillary reaches  $1/2$  in eye, which  $3\ 1/2$  in head pappenheimi.
- <sup>2</sup>  
c. Maxillary reaches behind eye, which  $6\ 1/4$  in head lloydi.
- <sup>1</sup>  
b. Scales smaller, 64 to 105 in lateral line.
- <sup>1</sup>  
d. Anal origin below middle of dorsal base; pectoral reaches less than  $1/3$  to ventral, which inserted well before dorsal origin  
affinis.
- <sup>2</sup>  
d. Anal origin below last third of dorsal base; pectoral reaches less than half way to ventral origin, which well before dorsal origin  
pluriserialis.
- <sup>3</sup>  
d. Anal origin entirely behind dorsal fin base; pectoral reaches  $2/3$  to ventral origin, which nearly opposite dorsal origin  
erimelas.
- <sup>2</sup>  
a. ALCOCKELLA new subgenus. Vent well before dorsal or but slightly nearer anal origin than pectoral origin; scales 62 in lateral line.  
garmani.

Subgenus NARCETES Alcock

Narcetes pappenheimi new species.

I  
Depth  $6 \frac{3}{5}$ ; head 3, width  $2 \frac{3}{4}$ . Snout  $3 \frac{4}{5}$  in head; eye  $3 \frac{1}{5}$ , greatly exceeds snout or interorbital; maxillary reaches  $\frac{1}{2}$  in eye, expansion 2 in eye, length 2 in head; interorbital very narrow, bony, 4 in eye; opercle with few weak radiating striae. Gill rakers  $6 + 18$ , lanceolate, slender.

Scales 45 in lateral line to caudal base; 5 (?) above, 5 (?) below, 23 (?) predorsal forward to occiput. Head apparently scaleless. Scaleless. Scales very caducous, all now fallen.

D. 15, I, fin low, rays all damaged, fin origin midway between inner ~~and~~ upper end of gill cleft and caudal base; A. 10, I, like dorsal, low and rays all broken, fin origin opposite base of twelfth dorsal ray; caudal moderate, damaged, rudimentary rays small and inconspicuous; least depth of caudal peduncle 5 in head; pectoral damaged, short, small; ventral  $3 \frac{1}{2}$  (?) origin midway between eye center and caudal base.

Head black. Iris neutral black, pupil ivory white. Inside mouth and gill opening black. Body brown. Fins all brownish.

Diagnosis. Differs from *Narcetes erimelas* chiefly in its short maxillary reaching only center of eye, greatly shorter paired fins, of which ventral inserted before the dorsal.

Type, No.

U.S.N.M.

3841. D. 5608. Binang Unang Island (N.), N.  $80^{\circ}$  E., 21 miles (S.  $00^{\circ} 11'$  E.  $121^{\circ} 16'$ ), Gulf of Tomini, Celebes. In 1092 fathoms. November 18, 1909. Length 120 mm. Type.

Narcetes lloydi new species.

Depth  $4 \frac{3}{4}$  (?); head  $3 \frac{3}{5}$  (?); head  $3 \frac{3}{5}$ , width  $3 \frac{1}{4}$ . Snout  $3 \frac{2}{5}$  in head from snout tip; eye  $6 \frac{1}{4}$ , 2 in snout,  $1 \frac{2}{3}$  in interorbital; maxillary reaches behind eye at least  $\frac{2}{3}$  <sup>eye</sup> diameter; expansion equals eye, length  $1 \frac{5}{6}$  in head from snout tip; mandible slightly protrudes with slight pointed bony spur pointing forward from symphysis; teeth rather long, slender, slightly curved, in bands in jaws and inner longest; irregular row of similar teeth on each palatine and scarcely any on vomer; interorbital 5, low, with broad deep groove extending on cranium to occiput; opercle with numerous feeble though distinct radiating striae. Gill rakers 5 + 17, lanceolate, slightly longer than eye; gill filaments  $\frac{3}{5}$  of gill rakers.

Scales 50 in lateral line to caudal base; 7 above, 7 below, 38 predorsal forward to occiput. Lateral line complete, well marked, tubes slender and well exposed. Scales very caducous, all fallen, and apparently not on head excepting occiput.

D. 18 (?), inserted midway between hind preopercle edge and caudal base; A. 12, (?), inserted below last third of dorsal base; caudal damaged, apparently forked, small inconspicuous rudimentary rays 16 above or below; least depth of caudal peduncle  $3 \frac{2}{3}$  in head; paired fins lost.

Head black. Iris neutral black, pupil brown. Body brown, scale pockets dusky to blackish brown. Inside mouth and gill opening blackish. Fins brownish.

Diagnosis. The poorly preserved specimen representing this species belongs in Narcetes. It differs from Narcetes erimelas Alcock in the anal origin at least below the last third of the dorsal base.

Type. U.S.N.M.

8740. D. 5460. Sialat Point Light, N.  $24^{\circ}$  E., 8.2 miles (N.  $13^{\circ}$



32 ' 30 " E. 123 ° 58 ' 6 " ), east coast of Luzon. In 565 fathoms. June 110, 1909. Length 470 (?) mm., broken and in poor preservation.

Type.

Narcetes affinis Lloyd

Narcetes affinis LLOYD, Ann. Mag. Nat. Hist., series 7, vol.18, 1906, p.308, fig. 1 - a, (scale lateral line). Gulf of Oman; Illustrat. Zool. Investigator, Fishes, pt.9, 1908, pl.42, figs.1 - 1a; Mem. Indian Mus., vol.2, No.3, August 1909, p.149 (type).

Depth  $6 \frac{3}{5}$ ; head  $3 \frac{2}{3}$ . Snout  $4 \frac{1}{5}$  in head; eye  $5 \frac{1}{3}$ ,  $1 \frac{1}{3}$  in snout; maxillary reaches  $\frac{3}{4}$  eye diameter behind eye, expansion  $1 \frac{2}{3}$  in eye, length  $1 \frac{7}{8}$  in head; interorbital low.

Scales 93 in lateral line to caudal base, close above along its course, and 4 more on caudal base, close above along its course, and 4 more on caudal base; tubular scales 69 in lateral line to caudal base and 3 more on latter; 8 above, 7 below.

D. III, 14, first branched ray 4 in head; A. III, <sup>11,</sup> first branched ray  $3 \frac{7}{8}$ ; caudal  $1 \frac{7}{8}$  (?), forked; least depth of caudal peduncle  $4 \frac{1}{4}$ ; pectoral  $3 \frac{3}{5}$ ; ventral  $3 \frac{1}{2}$ .

Almost black, head and lining of gill opening jet black. Length 358 mm. (Lloyd.)

Gulf of Oman.

Narcetes pluriserialis Garman

Narcetes pluriserialis GARMAN, Mem. Mus. Comp. Zool., vol.24, 1899, p.289, pl.57,

fig.3. N.  $5^{\circ} 31'$  W.  $86^{\circ} 31'$ , 1010 fathoms, Gulf of Panama.

D  
Depth  $6 \frac{1}{8}$ ; head  $3 \frac{1}{4}$ . Snout to eye  $3 \frac{1}{2}$  in head; orbit  $5 \frac{7}{8}$ ; eye 8,  $2 \frac{1}{5}$  in snout,  $\frac{3}{5}$  of interorbital; maxillary extends  $\frac{7}{8}$  of eye behind eye, expansion  $\frac{7}{8}$  of eye, length  $1 \frac{7}{8}$  in head; teeth small, subconic, hooked, incurved, unequal, bands of several series on premaxillaries, maxillaries, dentaries and palatines, outer series smallest, inner much largest and depressible; single large tooth each side of vomer; interorbital low. Gill rakers 3 + 13, less half of eye.

Scales 105 in lateral line; 11 above, 9 below.

D. 19, fifth ray  $6 \frac{3}{4}$  in head; A. 14, eighth ray  $5 \frac{3}{5}$ ; caudal damaged, evidently forked; least depth of caudal peduncle  $3 \frac{3}{4}$ ; pectoral damaged; ventral  $5 \frac{1}{3}$ .

Deep black over entire surface and linings of body cavity. Length 432 mm.

Gulf of Panama.

Narcetes erimelas Alcock

Narcetes erimelas ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.6, 1890, p.305.

About 75 miles west of Goa coast, Laccadive Sea (N. Lat.  $15^{\circ} 02'$  E. Long.  $72^{\circ} 34'$ ), in 740 fathoms; Illustrat. Zool. Investigator, Fishes, pt.1, 1892, pl.4, fig.1. - GOODE and BEAN, Oceanic Ichthy., 1895, pp. 45, 510 (copied). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.335 (compiled); Cat. Deep Sea Fishes Indian Mus., 1899, p.175 (Arabian Sea near Laccadive Islands, 740 fathoms).

Depth  $5 \frac{1}{8}$ ; head 3. Snout 3 in head; eye  $5 \frac{4}{5}$ ,  $1 \frac{9}{10}$  in snout, less

than interorbital; maxillary reaches  $4/5$  eye diameter beyond eye, expansion equals eye, length  $1\ 2/3$  in head; teeth small, even, uniform, acute, quadriserial anteriorly on premaxillary and dentary, triserial laterally in premaxillary and biserial on dentary, maxillary uniserial, also on palatines; 2 or 3 teeth each side of vomer; interorbital low, deeply concave. Gill rakers long as eye, close set.

Scales in lateral line 64 to caudal base and 4 more on latter; 10 above, 8 below. Scales deciduous.

D. III, 13, first branched ray  $3\ 7/8$  in head; A. 13, first branched ray  $4\ 7/8$ ; caudal  $1\ 3/4$ , well emarginate; least depth of caudal peduncle  $3\ 2/5$ ; pectoral 2; ventral 3, inserted nearly below dorsal origin.

Head, iris, body, fins, inside mouth and gill chamber and entire peritoneum, deep black. Length 344 mm. (Alcock)

Indian Ocean.

ALCOCKELLA new subgenus

Type Narcetes garmani new species.

Diagnosis. Known by its advanced vent, small anal and long pectorals.

Narcetes garmani new species, width

Depth  $6\ 1/5$ ; head  $3\ 3/5$ , width  $2\ 3/5$ . Snout 3 in head as measured from snout tip to eye; orbit 5; eye  $7\ 3/5$ ,  $2\ 2/5$  in snout,  $1\ 3/5$  in interorbital; maxillary lost, apparently may have extended slightly behind eye, expanded terminally, length  $1\ 7/8$  (?) in head; interorbital  $4\ 7/8$ , nearly level, with low median ridge; opercle with 4 well marked radiating striae and more numerous finer radiating less developed striae; preopercle with radiating

striae around bend. Gill rakers  $7 + 21$ , lanceolate, slender,  $1 \frac{2}{5}$  in eye; gill filaments  $\frac{3}{4}$  of gill rakers.

Scales 62 in lateral line to caudal base and 3 (?) more on latter; 7 above, 7 below, 44 predorsal forward to occiput. Bases of vertical fins evidently scaly. Scales thin, cycloid, very caducous, most all fallen. Tubes in lateral line slender, well marked, emphasized with black pigment terminally.

D. 23, I, rays all damaged, low, fin origin midway between beginning of lateral line and caudal base, fin base  $1 \frac{4}{5}$  in head; A. 6, I, small, rays all damaged, low, fin inserted close behind hind basal end of dorsal, base length 6 in head; caudal damaged, apparently forked, 14 or 15 rudimentary caudal rays above or below, not prominent; least depth of caudal peduncle 4; pectoral 2, long, reaches close to ventral; ventral  $2 \frac{1}{3}$  (?), well advanced or fin origin much nearer snout tip than caudal base; vent well in advance of dorsal or but slightly nearer anal origin than pectoral.

Head black. Iris slate black. Inside mouth and gill opening black. Body brown, dusky on belly. Fins brownish, paired ones darker.

Diagnosis. Contained chiefly in the subgeneric distinctions.

Type No. U.S.N.M.

10100. D. 5282. Malavatuan Island (N.), S.  $84^{\circ}$  W., 6. 20 miles (N.  $13^{\circ} 53'$  E.  $120^{\circ} 26' 45''$ ), China Sea vicinity of southern Luzon. In 248 fathoms. July 18, 1908. Length 158 mm. Type.

Genus PLATYTROCTEGEN Lloyd

Platytröctegen LLOYD, Mem. Indian Mus., vol.2, No.3, Aug. 1909, p.145.

Type Platytröctegen mirus LLOYD, monotypic

Body ovoid, well compressed. Head moderate, compressed. Snout short. Eye large. Teeth minute, in jaws and on vomer. Left gill cover overlaps right and with extra or seventh small branchiostegals (6 on right side). Scales small, smooth. Lower ends of clavicles form together single bony spine. Small tubular papilla, with an apical pore, close behind opercle and level with eye center. Dorsal and anal each with 23 rays. Pectoral rays 28. Ventral rays 5, fin inserted close before dorsal origin.

Closely resembles Platytroctes but differs in the presence of ventral fins, flat cranium, smooth scales, single clavicular spine and longer dorsal and anal fins.

Platytroctegen mirus Lloyd

Platytroctegen mirus LLOYD, Mem. Indian Mus., vol.2, No.3, Aug. 1909, p.145, pl.44, figs. 1 - 1 a. Bay of Bengal, 500 fathoms.

Depth  $2 \frac{3}{4}$ ; head  $3 \frac{1}{4}$ , width  $1 \frac{4}{5}$ . Snout  $4 \frac{3}{4}$  in head from snout tip; eye 3, greater than snout; maxillary would reach  $\frac{1}{3}$  (?) in eye, expansion  $2 \frac{1}{4}$  in eye, length  $2 \frac{3}{5}$  in head from snout tip; teeth minute, uniserial, on premaxillaries, maxillaries and dentaries; few small teeth on vomer, none on palatines; interorbital low, nearly flat. Gill rakers long as gill filaments,  $\frac{1}{3}$  of eye.

Scales very small, smooth.

D. 23, inserted little before anal origin, fin height  $2 \frac{1}{2}$  in total head length; A. 23, fin height 4; caudal  $1 \frac{9}{10}$ , deeply forked, slender lobes pointed; least depth of caudal peduncle  $5 \frac{1}{8}$ ; pectoral  $4 \frac{1}{5}$ ; ventral 5.

(Black. Length 130 mm. (Lloyd.)

Indian Ocean.

## Genus PLATYTROCTES Günther

Platytröctes GÜNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, 1878, p.249. Type

Platytröctes apus GÜNTHER, monotypic.

Body short, elevated, compressed. Eye rather large. Mouth moderately wide. Premaxillaries, maxillaries and dentaries with uniserial small teeth. Small tooth each side of vomer. Gill opening wide. Gill rakers long, lanceolate. Branchiostegals 6. Pseudobranchiae present. Pyloric caeca rudimentary. Clavicle ends below in long, projecting, acute spine, 2 spines coalescent. Scales small, keeled. Dorsal and anal opposite, on tail, moderate. Caudal forked. Pectorals small. No ventrals.

Platytröctes apus Günther

Platytröctes apus GÜNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, 1878, p.249.

Mid Atlantic, in 1500 fathoms; Rep. Voy. Challenger, vol.22, 1887, p.229, pl.58, fig. A (type). - ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.6, 1890, p.307 (off Goa coast in 740 fathoms). - GOODE and BEAN, Oceanic Ichth., 1895, p.46 (copied). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.335 (compiled). - JORDAN and EVERMANN, Bull. U.S.Nat. Mus., No.47, pt.1, 1896, p.458 (compiled). - ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p.177 (Arabian Sea, in the neighborhood of the Laccadive banks, 740 fathoms). - ZUGMAYER, Rés. Camp. Sci. Monaco, vol.35, 1911, p.8 (N. 37° 38' W. 10° 53', 4900 meters). - ROULE, Bull. Inst. Océanogr Monaco, No.320, May 20, 1916, p.12 (Canaries, 1786 meters); Rés. Camp. Sci. Monaco, vol.52, 1919, p.14, pl.1, fig.4, a - c (1 1/2 miles off Hierro, Canaries, 1786 meters).

Platytröctes procerus BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.23, fig.3. N. 14° 39' 5" W. 51° 8', 2500 meters, Cape

Verde Islands.

Depth  $2 \frac{3}{4}$ ; head  $3 \frac{2}{5}$ , width  $1 \frac{4}{5}$ . Snout  $3 \frac{2}{5}$  in head from snout tip; eye  $3 \frac{1}{8}$ , greater than snout or interorbital; maxillary reaches  $\frac{1}{8}$  in eye, expansion  $1 \frac{7}{8}$  in eye, length  $2 \frac{1}{4}$  in head; teeth uniformly minute; interorbital, concave. Gill rakers  $10 + 20$ , lanceolate, close set.

Scales 100 in lateral line, which straight; 17 above, 15 below.

D. 18, fin height  $3 \frac{1}{2}$  in total head; A. 17, fin height  $3 \frac{1}{2}$ ; caudal  $1 \frac{3}{4}$ , well forked; least depth of caudal peduncle 3; pectoral  $5 \frac{1}{4}$ .

Brown. Head, pectoral region, vent and fringes of caudal peduncle black. Length 140 mm. (Günther.)

Atlantic and Indian Oceans.

#### Genus ROULEINA Jordan

Rouleina JORDAN, Stanford Univ. Public. Biol. Sci., vol.3, No.2, 1923, p.122.

Type Aleposomus güntheri ALCOCK, orthotypic.

Body elongate, tapers backward from head. Head large, rather obtuse in front. Snout short. Eye large, advanced. Mouth large, lower jaw usually projects. Edges of jaws with uniserial small teeth. Gill openings wide, gill membranes joined below, free from isthmus. Body scaleless. Dorsal and anal short, subequal. Dorsal rays 15 to 21, anal rays 14 to 19. Paired fins usually small.

#### ANALYSIS OF SPECIES

- 1  
a. BATHYPROPTERON new subgenus. Anal origin little behind dorsal origin; maxillary reaches beyond eye center to hind eye edge or slightly beyond.
- 1  
b. Mandible protruding.
- c.<sup>1</sup> Eye  $3 \frac{2}{5}$  to  $3 \frac{1}{2}$  in head from snout tip; D. 16 or 17; A. 17 to 19;

maxillary reaches hind pupil edge to hind eye edge. nudus.

<sup>2</sup>  
c. Eye  $3 \frac{3}{4}$  in head from snout tip; D. 18 or 19; A. 17; maxillary reaches hind pupil edge watasei.

<sup>3</sup>  
c. Eye  $3 \frac{1}{2}$  to 4 in head from snout tip; D. 18 to 20; A. 15 to 18; maxillary reaches hind eye edge or beyond squamilaterum.

<sup>2</sup>  
b. Mandible included in upper jaw; eye  $3 \frac{2}{3}$  in head; D. 19 to 21; A. 18 or 19 lividus.

<sup>2</sup>  
a. ROULEINA. Anal origin opposite dorsal origin; maxillary reaches  $\frac{1}{2}$  in eye guntheri.

BATHYPROPTERON new subgenus

Type Aleposomus nudus Brauer.

Diagnosis. Anal origin little behind dorsal origin. Maxillary reaches beyond dorsal origin. Maxillary reaches beyond eye center to hind eye edge or slightly beyond.

(*βαθύς*, deep; *πρὸ*, before; *πτερόν*, fin; with reference to the advanced dorsal.)

Rouleina nudus (Brauer)

Aleposomus nudus BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.22, pl.2, fig.2. Off Sumatra (S. Lat.  $0^{\circ} 39' 2''$  E. Long.  $98^{\circ} 52' 3''$ ), in 750 meters. - WEBER and BEAUFORT, Fishes Indo-Austral. Archipelago, vol.2, 1913, p.105, fig.36 (copied). Rouleina nudus NORMAN, Discovery Rep., vol.2, 1930, p.271 (reference).



Depth 5 to  $5 \frac{7}{8}$ ; head 3 to  $3 \frac{1}{3}$ , width  $2 \frac{2}{5}$  to  $3 \frac{1}{5}$ . Snout  $4 \frac{7}{8}$  to 5 in head from snout tip to eye; orbit  $2 \frac{7}{8}$  to 3; eye  $3 \frac{2}{5}$  to  $3 \frac{1}{2}$ , greater than snout or interorbital; maxillary reaches opposite hind pupil edge to hind eye edge, expansion 2 to  $\frac{3}{4}$  in eye, length 2 to  $2 \frac{1}{5}$  in head from snout tip; mandible ends in conic symphyseal point directed upward; bony interorbital  $2 \frac{7}{8}$  to  $3 \frac{1}{2}$  in eye, concave. Gill rakers 10 + 19, lanceolate, compressed, 3 times gill filaments or  $2 \frac{1}{4}$  in eye.

Tubular scales 47 to 57 in lateral line to caudal base and 7 more on latter, large, conspicuous. Scales all fallen. Skin with fine longitudinal parallel striae.

D. VI or VII, 10, I to 12, I, fourth branched ray  $2 \frac{1}{8}$  to  $2 \frac{1}{2}$  in total head length; A. III or IV, 14, I or 15, I, origin opposite base of fifth dorsal ray, first branched ray  $2 \frac{2}{3}$  to 3; caudal  $1 \frac{2}{5}$  to  $1 \frac{3}{4}$ , well forked, lobes terminate in slender points, large rudimentary rays usually 13 above or below; also well extended forward; least depth of caudal peduncle  $4 \frac{2}{3}$  to 5; pectoral  $2 \frac{2}{3}$  to 4, reach half way to ventral and usually  $1 \frac{4}{5}$ ; ventral  $2 \frac{1}{10}$  to  $2 \frac{3}{5}$  in head, inserted last  $\frac{2}{5}$  to  $\frac{3}{5}$  in space between pectoral and anal origins,  $\frac{4}{5}$  to  $\frac{7}{8}$  to vent, which close before anal.

Blackish brown generally. Eye ball ivory white. Inside mouth and gill openings blackish. Fins dark brown like general body color.

East Indies, Philippines. Known by its dorsal and anal fins opposed, well developed rudimentary caudal rays, comparatively long paired fins, large eye and anteriorly directed spur or spine at symphyseal tip of lower jaw. Of all described species it approaches closest to Rouleina nudus (Brauer), especially in the <sup>mandibular</sup> ~~mandibles~~ point, long paired fins, maxillary, dorsal and anal rays and rudimentary caudal rays. It differs clearly in the larger eye, always

conspicuously larger than the snout, more elongate and slender body and more deeply forked caudal. Rouleina lividus (Brauer) is different in its deeper body and absence of the mandibular point, Brauer's figure of Aleposomus lividus showing the mandible concealed in the upper jaw.

Some specimens show the scattered black spots on the body, usually quite inconspicuous. Often the bases of the unpaired vertical fins are pale or livid dark gray. Frequently the upper concealed edge of the maxillary is gray to somewhat bright gray blue. Preserved specimens are often with pigment rubbed off the trunk.

D. 5467. Atulayan Island (S.), S.  $79^{\circ}$  W., 2.5 miles (N.  $13^{\circ} 35'$  27" E.  $123^{\circ} 37' 18''$ ), east coast of Luzon. In 480 fathoms. June 18, 1909. Length 123 to 205 (?) mm. 5 examples. Poorly preserved.

2878. D. 5469. Atulayan Island (E.), S.  $63^{\circ}$  W., 4 miles (N.  $13^{\circ} 36' 48''$  E.  $123^{\circ} 38' 24''$ ). In 500 fathoms. June 18, 1909. Length 194 mm.

3499. D. 5526. Balicasag Island (C.), N.  $15^{\circ}$  W., 18.4 miles (N.  $19^{\circ} 12' 45''$  E.  $123^{\circ} 45' 30''$ ), between Siquijor and Bohol. In 805 fathoms. August 11, 1909. Length 215 mm.

1494 to 1503, 3072 to 3076. D. 5527. Balicasag Island (C.), N.  $14^{\circ}$  W., 8.2 miles (N.  $9^{\circ} 22' 30''$  E.  $123^{\circ} 42' 40''$ ). In 392 fathoms. August 11, 1909. Length 76 (?) to 222 mm.

3479 and 3480. D. 5528. Balicasag Island (C.), N.  $15^{\circ}$  E., 5.8 miles (N.  $9^{\circ} 24' 45''$  E.  $123^{\circ} 39' 15''$ ). In 439 fathoms. August 11, 1909. Length 212 to 218 mm.

10155, 10224, 10225, 10259, 10277. D. 5423. Cagayan Island (S.), S.  $11^{\circ}$  E., 4.8 miles (N.  $9^{\circ} 38' 30''$  E.  $121^{\circ} 11'$ ), Jolo Sea. In 508

fathoms. March 31, 1909. Length 213 to 235 (?) mm.

10226, 10257, 10258. D. 5424. Cagayan Island (S.), S.  $11^{\circ}$  W., 3.4 miles (N.  $9^{\circ} 37' 5''$  E.  $121^{\circ} 12' 37''$ ). In 340 fathoms. March 31, 1909. Length 210 to 230 (?) mm.

2387. D. 5510. Camp Overton Light, S.  $68^{\circ}$  E., 9.1 miles (N.  $8^{\circ} 16' 3''$  E.  $124^{\circ} 3' 50''$ ), northern Mindanao and vicinity. In 423 fathoms. August 7, 1909. Length 163 mm.

D. 5511. Camp Overton Light, S.  $80^{\circ}$  E., 15.3 miles (N.  $8^{\circ} 15' 20''$  E.  $123^{\circ} 57'$ ). In 410 fathoms. August 7, 1909. Length 122 to 212 mm. 15 examples.

1571. D. 5512. Camp Overton Light, S.  $76^{\circ}$  E., 14 miles (N.  $8^{\circ} 16' 2''$  E.  $123^{\circ} 58' 26''$ ). In 445 fathoms. August 7, 1909. Length 192 mm.

1578 to 1580. D. 5513. Camp Overton Light, S.  $67^{\circ}$  E., 10.3 miles (N.  $8^{\circ} 16' 45''$  E.  $124^{\circ} 2' 48''$ ). In 505 fathoms. August 7, 1909. Length 105 (?) to 196 mm.

2153. D. 5515. Camp Overton Light, S.  $26^{\circ}$  E., 24.6 miles (N.  $8^{\circ} 34' 48''$  E.  $124^{\circ} 1' 24''$ ). August 8, 1909. Length 240 mm.

10231. D. 5654. Cape Tabako, N.  $17^{\circ}$  E., 21.5 miles (N.  $3^{\circ} 42' 1''$  S.  $120^{\circ} 45' 50''$ ), Gulf of Boni, Celebes. In 805 fathoms. December 18, 1909. Length 235 (?) mm., broken in middle.

2144. D. 5492. Diuata Point (W.), S.  $45^{\circ}$  W., 15.2 miles (N.  $9^{\circ} 12' 45''$  E.  $125^{\circ} 20'$ ), between Leyte and Mindanao. In 735 fathoms. August 1, 1909. Length 173 mm.

2908. D. 5494. Diuata Point (N.), N.  $74^{\circ}$  W., 4.2 miles (N.  $9^{\circ} 6'$

' 30 " E. 125 ° 18 ' 40 "). In 678 fathoms. August 2, 1909. Length 198 mm.

4465. D. 5495. Diuata Point (N.), S. 76 ° E., 9.4 miles (N. 9 ° 6 ' 30 " E. 125 ° 00 ' 20 "). In 976 fathoms. August 1, 1909. Length 145 mm.

2588. D. 5438. Hermana Mayor Light, S. 21 ° E., 7.5 miles (N. 15 ° 54 ' 42 " E. 119 ° 44 ' 42 "), west coast of Luzon. In 297 fathoms. May 8, 1909. Length 194 (?) mm.

2716, 2731 to 2733, 5458, 5660, 5463, 5467, 5468. D. 5201. Limasaua Island (E.), S. 1 ° E., 14.80 miles (N. 10 ° 10 ' E. 125 ° 4 ' 15 "), Sogod Bay, southern Leyte. In 554 fathoms. April 10, 1908. Length 176 (?) to 270 mm.

4285. D. 5203. Limasaua Island (S.), S. 38 ° W., 5.50 miles. (N. 9 ° 58 ' E. 125 ° 7 ' 40 "). In 775 fathoms. April 10, 1908. Length 193 mm.

5689 and 5690. D. 5219. Mompog Island (N E.), N. 35 ° 30 ' W., 12.25 miles (N. 13 ° 21 ' E. 122 ° 18 ' 45 "), between Marinduque and Luzon. In 530 fathoms. April 23, 1908. Length 250 (?) fathoms. April 23, 1908. Length 250 (?) to 255 mm.

4783. D. 5126. Nogas Island (W.), S. 26 ° 30 ' E. 11.75 miles (N. 10 ° 34 ' 45 " E. 121 ° 47 ' 30 "), Sulu Sea vicinity of southern Panay. In 742 fathoms. February 3, 1908. Length 325 mm.

3813. D. 5646. North Island (S.), S. 68 ° E. 7.5 miles. (S. 5 ° 31 ' 30 E. 122 ° 22 ' 40 "), Buton Strait. In 456 fathoms. December 16, 1909. Length 188 mm.

3490. D. 5647. North Island (S.), S. 87 ° E., 11.6 miles (S. 5 °

34 E. ' E. 122 ° 18 ' 15 "). In 519 fathoms. December 19, 1909.

Length 196 (?) mm.

3059 and 3060. D. 5447. San Miguel Point, S. 7 ° W., 3.5 miles (N. 13 ° 28 ' E. 123 ° 46 ' 18 "), east coast of Luzon. In 310 fathoms. June 4, 1909. Length 175 (?) to 183 mm.

9159. D. 5487. San Ricardo Point (Panaon Island), S. 50 ° E., 11.2 miles (N. 10 ° 2 ' 45 " E. 125 ° 5 ' 33 "), between Leyte and Mindanao. In 732 fathoms. July 31, 1909. Length 258 mm.

1471, 1476, 1477, 3192. D. 5488. San Ricardo Point (Panaon Island) S. 59 ° E., 9 miles (N. 10 ° E. 125 ° 6 ' 45 "). In 772 fathoms. July 31, 1909. Length 200 to 208 (?) mm.

Rouleina watasei (Tanaka)

Aleposomus watasei TANAKA, Journ. College Sci. Tokyo, vol.27, Art. B, Oct. 10, 1909, p.14. Outside Okinose, in about 700 fathoms.

Rouleina watasii NORMAN, Discovery Rep., vol.2, 1930, p.271 (reference).

Depth  $6 \frac{1}{3}$ ; head  $4 \frac{2}{3}$ . Snout  $4 \frac{1}{3}$  to 6 in head; eye  $3 \frac{3}{4}$ , greater than interorbital; maxillary reaches hind pupil edge; teeth very slender, uniserial, none on palate, or tongue; interorbital  $5 \frac{1}{2}$  in head. Gill rakers 8 + 10.

Body naked. Lateral line complete, slightly decurved, extends slightly nearer back than belly.

D. 18 or 19, inserted before front of hind third in space between snout tip and bases of median caudal rays; A. 17, inserted below fourth dorsal ray; not reaching caudal; hind ends of dorsal and anal at same vertical; caudal

strongly emarginate; pectoral rays 8, fin low, small; ventral rays 6 or 7, origin midway between pectoral base and hind edge of anal base.

Jet black, fins all paler. Black nodules sparsely scattered throughout body. Length 265 mm. (Tanaka.)

Japan.

Rouleina squamilaterus (Alcock)

Xenodermichthys squamilaterus ALCOCK, Ann. Mag. Nat. Hist., series 7, vol.2, 1898, p.148. Off Andaman Islands, in 370 to 419 fathoms; Illustrat. Zool. Investigator, pt.6, 1899, pl.25, fig.4; Cat. Deep Sea Fishes Indian Mus., 1899, p.181 (Arabian Sea, 370 to 419 fathoms).

Aleposomus (Rouleina) squamilaterus MC CULLOCH, Biolog. Res. Endeavour, vol.15, pt.4, June 8, 1926, p.163, pl.44, fig.1 (Great Australian Bight, 350 to 450 fathoms).

Rouleina squamilaterus NORMAN, Discovery Rep., vol.2, 1930, p. 271 (reference).

Depth  $4 \frac{2}{5}$  to  $5 \frac{2}{3}$ ; head  $3 \frac{1}{4}$  to  $3 \frac{1}{2}$ , width  $2 \frac{3}{5}$  to  $2 \frac{2}{3}$ . Snout 4 to  $5 \frac{2}{3}$  in head from snout tip to eye; orbit  $3 \frac{2}{5}$  to  $3 \frac{1}{2}$ ; eye  $4 \frac{3}{5}$  to  $4 \frac{3}{4}$ , greatly exceeds snout or interorbital; maxillary reaches nearly opposite hind eye edge, expansion  $1 \frac{1}{3}$  to  $2 \frac{3}{4}$  in eye, length  $2 \frac{1}{10}$  to  $2 \frac{1}{5}$  in head from snout tip; interorbital  $1 \frac{3}{4}$  to  $2 \frac{1}{4}$  in eye,  $7 \frac{2}{3}$  to  $8 \frac{4}{5}$  in head from snout tip, low, with deep median groove. Gill rakers 8 or 9 + 12 to 20, lanceolate,  $2 \frac{1}{2}$  in eye; gill filaments  $\frac{2}{5}$  of gill rakers.

Lateral line distinct, axial along side of body.

D. VI, 14, I, rays all broken, fin base  $1 \frac{1}{2}$  to  $1 \frac{3}{5}$  in total head length, fin origin midway between hind gill opening and caudal base; A. II, 13 or 14,

rays all broken, fin base 2 in total head length; caudal damaged, with 10 rudimentary rays above or below; least depth of caudal peduncle  $4 \frac{1}{2}$  to  $4 \frac{3}{5}$  in total head; pectoral  $3 \frac{3}{5}$ ; ventral  $4 \frac{1}{4}$  (?).

Uniform blackish. Fins all paler than body or grayish. Upper edge of maxillary slipping under preorbital bluish. Iris slate black, pupil ivory white.

Indian Ocean, Great Australian Bight, Philippines.

10187. D. 5467. Atulayan Island (S.), S.  $79^{\circ}$  W., 2.5 miles (N.  $13^{\circ} 35' 27''$  E.  $123^{\circ} 37' 18''$ ), east coast of Luzon. In 480 fathoms. June 18, 1909. Length 258 (?) mm.

10186. D. 5468. Atulayan Island (S.), S.  $83^{\circ}$  W., 5.7 miles (N.  $13^{\circ} 35' 39''$  E.  $123^{\circ} 40' 28''$ ), east coast of Luzon. In 569 fathoms. June 18, 1909. Length 320 mm.

8469. D. 5423. Cagayan Island (S.), S.  $11^{\circ}$  E., 4.8 miles (N.  $9^{\circ} 38' 30''$  E.  $121^{\circ} 11'$ ), Jolo Sea. In 508 fathoms. March 31, 1909. Length 260 (?) mm.

9190. D. 5494. Diuata Point (N.), N.  $74^{\circ}$  W., 4.2 miles (N.  $9^{\circ} 6' 30''$  E.  $125^{\circ} 18' 40''$ ), between Leyte and Mindanao. In 678 fathoms. August 2, 1909. Length 255 mm.

10262. D. 5606. Dodepo Island (W.), N.  $3^{\circ}$  W., 10.8 miles (N.  $0^{\circ} 16' 28''$  E.  $121^{\circ} 33' 30''$ ), Gulf of Tomini, Celebes. In 834 fathoms. November 17, 1909. Length 383 (?) mm.

8505. D. 5429. Fondeado Island (SE.), N. 18 E., 15 miles (N.  $9^{\circ} 41' 30''$  E.  $118^{\circ} 50' 22''$ ), eastern Palawan and vicinity. In 766 fathoms. April 5, 1909. Head only, 87 (?) mm. long.

5457, 5459, 5464 to 5466. D. 5201. Limasaua Island (E.), S.  $1^{\circ}$  E.,

14. 80 miles (N.  $10^{\circ} 10'$  E.  $125^{\circ} 4' 15''$ ), Sogod Bay, southern Leyte. In 554 fathoms. April 10, 1908. Length 233 to 268 mm.

10289. D. 5648. North Island (S.), N.  $87^{\circ}$  E., 10.2 miles (S.  $5^{\circ} 35'$  E.  $122^{\circ} 20'$ ), Buton Strait. In 559 fathoms. December 16, 1909. Length 300 (?) mm.

9172. D. 5488. San Ricardo Point (Panaon Island), S.  $59^{\circ}$  E., 9 miles (N.  $10^{\circ}$  E.  $125^{\circ} 6' 45''$ ), between Leyte and Mindanao. In 772 fathoms. July 31, 1909. Length 285 mm.

4522. D. 5111. Sombrero Island, S.  $41^{\circ}$  E., 4.50 miles (N.  $13^{\circ} 45' 15''$  E.  $120^{\circ} 46' 30''$ ), China Sea off southern Luzon. In 236 fathoms. January 16, 1908. Length 90 mm. I place this specimen with Alcock's species as it is in agreement. It differs slightly, however, in that the lateral line is not quite so prominent, likely a matter of preservation. It has the same general physiognomy with an oblique ridge on opercle, comparatively short paired fins and the insertion of the fins similar.

Rouleina lividus (Brauer)

Aleposomus lividus BRAUER, Deutsch. Tiefsee Exp. Valdivia, vol.15, Tiefsee-Fische, 1906, p.21, pl.2, fig.1. Off Sumatra (S. Lat.  $3^{\circ}$  to N. Lat.  $1^{\circ}$  E Long.  $96^{\circ}$  to  $101^{\circ}$ ), in 768 to 1143 meters. - WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol.2, 1913, p.104 (copied). Rouleina lividus Norman, Discovery Rep., vol.2, 1930, p. 271 (reference).

Depth  $4 \frac{1}{3}$ ; head  $3 \frac{1}{5}$ . Snout 5 in head; eye  $3 \frac{2}{3}$ , greater than snout or interorbital; maxillary reaches hind eye edge, expansion 2 in eye, length 2



{in head; lower jaw included within upper; both jaws with small teeth, palate toothless; interorbital low.

Whole body strewn with small black papillae. Lateral line distinct, axial, complete.

D. 19 to 21, first branched ray  $2 \frac{3}{5}$  in head; A. 18 or 19, first branched ray  $2 \frac{3}{4}$ ; origin opposite first fifth of dorsal base; caudal  $1 \frac{3}{5}$ , well forked, with 9 prominent rudimentary rays extended well forward; least depth of caudal peduncle  $3 \frac{2}{5}$ ; pectoral  $2 \frac{1}{4}$ ; ventral  $3 \frac{4}{5}$ .

Blue black, with violet reflections, fins dark colored. Length 330 mm. (Brauer.)

#### Subgenus ROULEINA Jordan

Rouleina guentheri (Alcock)

Xenodermichthys guentheri ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.10, 1892, p. 357, pl.18, fig.3. Bay of Bengal ( N. Lat.  $15^{\circ} 43' 30''$  E. Long.  $81^{\circ} 19' 30''$  ), in 678 fathoms; Illustrat. Zool. Investigator, Fishes, pt.7, 1900, pl.32, fig.2.

Xenodermichthys guentheri GOODE and BEAN, Oceanic Ichth., 1895, p.48 (reference)  
ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p.180 (Bay of Bengal, off Madras coast, 678 fathoms; Arabian Sea, off Travancore coast, 430 fathoms).

Rouleina guentheri NORMAN, Discovery Rep., vol.2, 1930, p.271 (reference).

Depth  $5 \frac{1}{5}$ ; head 3. Snout  $5 \frac{1}{4}$  in head from snout tip; eye  $3 \frac{3}{4}$ , greater than snout or interorbital; maxillary reaches  $\frac{1}{2}$  in eye, expansion 2 in eye, length  $2 \frac{2}{5}$  in head from snout tip; row of minute close set teeth on premaxillaries, maxillaries and dentaries, palate toothless; interorbital

very low,  $1 \frac{1}{2}$  in eye. Gill rakers numerous, long, close set.

No scales on lateral line.

D. 15, fin height 5 in total head length; A. 14, origin opposite dorsal origin, fin height  $4 \frac{3}{4}$ ; caudal  $2 \frac{4}{5}$  (?), small, with numerous prominent rudimentary rays, forked; least depth of caudal peduncle 5; pectoral very short, 2 in eye; ventral equals eye.

Uniform jet black. Length 153 mm. (Alcock.)

Indian Ocean.

#### Genus XENODERMICHTHYS Günther

Xenodermichthys GÜNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, 1878, p. 250.

Type Xenodermichthys nodulosus GÜNTHER, monotypic.

Aleposomus GILL, American Naturalist, vol.18, 1884, P.433. Type Aleposomus copei GILL, monotypic.

Body elongate, compressed. Head small. Snout short. Eye large or moderate, anterior. Mouth moderate or small. Maxillary reaches middle of eye. Teeth rudimentary, on premaxillaries, maxillaries and dentaries, none on palate. Gill rakers rather few. Skin rather thick, scaleless, with numerous small nodules, mostly on lower surfaces. Dorsal and anal opposite or former little advanced. Dorsal rays 27 to 34. Anal rays 25 to 32. Caudal forked. Paired fins moderate.

#### ANALYSIS OF SPECIES

<sup>1</sup>  
a. ALEPOSOMUS. Depth  $5 \frac{2}{3}$  to  $5 \frac{4}{5}$ ; head  $3 \frac{3}{5}$  to  $4 \frac{1}{3}$ ; no lateral line;

D. 27 to 30; A. 25 to 29.

<sup>1</sup>  
b. Eye  $3 \frac{1}{8}$

copei.

Blackish brown, light brown on areas where skin torn away. Iris neutral dusky. Fins largely whitish, dorsal and anal with dark brown anteriorly.

Pacific Ocean.

75808 U.S.N.M. Monterey Bay, California. Albatross Station 4540.

Length 72 mm. Type of Zastomias scintillans.

Aristostomias tittmanni Welsh

Aristostomias tittmanni WELSH, Proc. U.S.Nat. Mus., vol.62, art.3, 1923, p.3,

fig.2. From 115 miles east of Cape Hatteras, 100 meters. - REGAN and TREWAVAS, Danish Dana Exped. Oceanogr. Rep., No.6, March 10, 1930, p.140, figs. 135 and 136 (N.  $8^{\circ}$  to  $37^{\circ}$  W.  $25^{\circ}$  to  $83^{\circ}$ , 40 to 2000 meters).

Depth  $6 \frac{1}{2}$ ; head  $3 \frac{1}{5}$ , width 4. Snout  $3 \frac{1}{4}$  in head; eye  $5 \frac{1}{2}$ ,  $1 \frac{2}{3}$  in snout,  $1 \frac{1}{5}$  in interorbital; maxillary extends  $2 \frac{3}{4}$  eye diameters behind eye, length but slightly less than head; teeth unequal, upper with 2 pairs of [long, hollow, terminally barbed canines, followed by 5 pairs of much smaller terminally recurved teeth, then 12 pairs of straight recumbent teeth; lower teeth with 2 pairs of large and 5 pairs of smaller blade like terminally barbed teeth, first 2 pairs fitting in grooves on side of snout where mouth closes; palatines with 4 small teeth each side; tongue with 2 groups of strong retrorse teeth; barbel inserted behind eye,  $1 \frac{3}{4}$  in combined head and body to caudal base, simple, filamentous, ends in smooth, ovoid knob; interorbital 4, convex. No gill rakers.

White ovoid luminous body in slit like socket close behind and below eye. Lateral photophores in 6 linear groups from pectoral to ventral, 4, 3, 3, 3, 3, 4, then group of 3 and 8 single more or less equidistant to vertical of anal

- $\frac{2}{b.}$  Eye  $3 \frac{3}{4}$  to 4 socialis.
- a. XENODERMICHTHYS. Depth  $6 \frac{3}{4}$ ; head  $5 \frac{1}{4}$ ; lateral line present; D. 34,  
A. 32, nodulosus.

Xenodermichthys copei (Gill)

Aleposomus copei GILL, American Naturalist, vol.18, 1884, p.433. Gulf Stream.-

GOODE and BEAN, Oceanic Ichth., 1895, p.47, pl.14, fig.51 (type from N.  $37^{\circ} 12' 20''$  W.  $69^{\circ} 39'$ , 2949 fathoms). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47, pt.1, 1896, p.459 (compiled).

Depth  $5 \frac{2}{3}$ ; head  $3 \frac{2}{5}$ , width  $3 \frac{1}{5}$ . Snout from snout tip to eye 4 in head; orbit  $2 \frac{1}{4}$ ; eye  $3 \frac{1}{8}$ , greater than snout or interorbital; maxillary reaches  $\frac{1}{2}$  in eye, expansion  $2 \frac{1}{4}$  in eye, length  $2 \frac{2}{5}$  in head; interorbital 4 in eye, very narrow, concave; opercle with 2 radiating keels. Gill rakers  $9 + 19$ , lanceolate,  $\frac{1}{2}$  of eye, 4 times gill filaments.

No scales. Lower half of body including head and anal fin, with scattered very small and rather numerous nodules. Lateral line as axial groove or impression along side, complete.

D. 27, rays all low or fin height about 3 in head; A. 25, origin slightly behind dorsal origin, fin like dorsal, fin height  $3 \frac{1}{4}$  in head; caudal broken, apparently emarginate, 8 to 10 inconspicuous rudimentary rays above or below; least depth of caudal peduncle  $5 \frac{1}{5}$ ; pectoral low, very small, broken, about long as pupil; ventral about equals eye, inserted midway between front eye edge and caudal base.

Generally blackish brown, small nodules inconspicuously black. Iris neutral black, pupil ivory white. Fins pale or whitish.

Gulf Stream.

3355 U.S.N.M. N.  $37^{\circ} 12' 20''$  W.  $69^{\circ} 39'$  Albatross Station

2099. October 2, 1883. Length 81 mm. In 2949 fathoms. Type.

Xenodermichthys socialis Vaillant

Xenodermichthys socialis VAILLANT, Exped. Travailleur et Talisman, Poiss., 1888, p. 162, pl.13, figs.1 a - b. Coasts of Morocco, Soudan, Banc d'Arguin, 717 to 1350 meters. - COLLET, Rés. Camp. Sci. Monaco, vol.10, 1896, p.138 (N.  $38^{\circ} 46' 30''$  W.  $30^{\circ} 40' 50''$ , 696 meters). - KOEHLER, Ann. Univ. Lyon, vol.3, 1896, p.520, pl.27, fig.11. - Monaco, Bull. Inst. Océanogr. Monaco, No.45, June 1905, p.105, fig.93 (off Azores, in 700 mm.). - HOLT and BYRNE, Depart. Agric. Ireland Fisher. Sci. Investigation, No.5, 1906, p. 48, pl.5, fig.2. - RICHARD, Bull. Inst. Océanogr. Monaco, No. 162, Feb. 1910, p.151, fig. 108 (upper) (Azores, 696 meters). - ROULE, Bull. Mus. Hist. Paris, No. 2, 1915, p.42 ( ) Rés. Camp. Sci. Monaco, vol.52, 1919, p.10, pl.1, fig.5 ( ) - BARNARD, Ann. South African Mus., vol.21, 1925. P.123 (off East London, 300 to 400 fathoms). - NORMAN, Discovery Rep., vol.2, 1930, p.270 (S.  $5^{\circ} 54'$  E.  $11^{\circ} 19'$ , 150 meters).

Aleposomus socialis GOODE and BEAN, Oceanic Ichth., 1895, p.48, pl.16, fig.58 (compiled).

Aleposomus cyaneus ZUGMAYER, Bull. Inst. Océanogr. Monaco, No.288, 1914. pl.1.

Depth  $5 \frac{2}{3}$  to  $5 \frac{4}{5}$ ; head 4 to  $4 \frac{1}{3}$ , width  $2 \frac{1}{2}$  to 3. Snout 4 in head measured from snout tip to eye; orbit  $2 \frac{3}{5}$  to 3; eye  $3 \frac{3}{4}$  to 4, equals or a little greater than snout, nearly twice interorbital; maxillary reaches  $\frac{2}{5}$  in eye, expansion 2 in eye, length  $2 \frac{1}{4}$  to  $2 \frac{2}{5}$  in head from snout tip;

mandible protruded, with short projecting symphyseal spur; interorbital  $6 \frac{1}{2}$  to 8, low, broadly depressed. Gill rakers  $6 + 17$ , lanceolate, slender, compressed,  $1 \frac{1}{2}$  in eye; gill filaments  $\frac{2}{5}$  gill rakers.

Skin smooth, with many minute scattered nodules, mostly over lower portions of head and body, also fins. Lateral line complete, axial, along side and with small weak tubes.

D. 29 or 30, fin height  $2 \frac{4}{5}$  to  $3 \frac{1}{8}$  in total head length; A. 28 or 29, fin height  $2 \frac{1}{2}$  to  $2 \frac{7}{8}$ , fin origin slightly behind dorsal origin; caudal broken, apparently forked, rudimentary rays 12 or 13 above or below, inconspicuous; least depth of caudal peduncle 4 to  $4 \frac{1}{3}$ ; pectoral broken, about equals orbit (?); ventral broken, apparently little shorter than pectoral, origin little nearer mandible tip than caudal base.

Largely blackish brown. Iris neutral or slate black, pupil brownish white. Inside gill opening black. Fins pale.

Eastern Atlantic.

42096 U.S.N.M. (No data.)

Museum Hist. Nat. Paris 85. 187.

Length 131 mm.

42097 U.S.N.M. (No data.)

Museum Hist. Nat. Paris 85. 213.

Length 126 mm.

Xenodermichthys nodulosus Günther

Xenodermichthys nodulosus GÜNTHER, Ann. Mag. Nat. Hist., series 5, vol.2, 1878, p. 250. Off Yeddo, Japan, in 345 fathoms; Rep. Voy. Challenger, vol.1, pt. 6, 1880, p.63 (reference); vol.22, 1887, p.230, pl.58, fig. C (type). - GOODE and BEAN, Oceanic Ichthy., 1895, p.46, fig.57 (compiled).- JORDAN and STARKS, Bull. U.S.Fish Comm., vol.22, 1902 (1904), p.579 (Sagami Bay). -

JORDAN and HERRE, Proc. U.S. Nat. Mus., vol.31, 1906, p.642 (Sagami Bay example).

Depth  $6 \frac{3}{4}$ ; head  $5 \frac{1}{4}$ , width  $2 \frac{3}{4}$ . Snout from snout tip to eye  $5 \frac{2}{5}$  in head; orbit  $3 \frac{1}{4}$ ; eye  $4 \frac{1}{2}$ , greater than snout or interorbital; maxillary reaches  $\frac{3}{5}$  in eye, expansion  $1 \frac{1}{3}$ , length  $2 \frac{7}{8}$  in head from snout tip; mandible protrudes armed with large blunt point in front; interorbital  $5 \frac{1}{3}$ , nearly level. Gill rakers  $7 + 19$ , lanceolate, length  $1 \frac{2}{3}$  in eye; gill filaments  $\frac{1}{2}$  of gill rakers.

Skin smooth, with very fine longitudinal striae. Along lateral line to caudal base 50 myomeres. Body with small, rounded, inconspicuous, irregular, scattered nodules. Lateral line distinct, axial along middle of side, pores not always distinct.

D. 34, fin height  $2 \frac{2}{5}$  in head; A. 32, fin height  $2 \frac{2}{5}$ ; caudal  $1 \frac{3}{5}$ , well forked, 17 rather conspicuous rudimentary rays above or below; least depth of caudal peduncle  $3 \frac{1}{2}$ ; pectoral  $1 \frac{3}{4}$ ; ventral  $2 \frac{1}{4}$ , inserted nearer mandible tip than caudal base.

Body dark neutral gray to blackish. Head largely pale gray. Iris slate gray, pupil ivory white. Inside mouth dusky, inside gill opening blackish. Fins all pale or whitish in contrast to blackish body, even rudimentary caudal rays.

Japan. My example agrees with Günther's figure, though its color much more contrasted.

51433. U.S.N.M. Sagami Bay, Japan. In 20 to 265 fathoms. Albatross Collection 3697. May 5, 1900. Length 230 mm.

Genus LEPTODERMA Vaillant

Leptoderma VAILLANT, Exped. Sci. Travailleux et Talisman, Poiss., 1888, p.165.

Type Leptoderma macrops VAILLANT, Monotypic.

Body elongate, slender, gradually tapering behind until filiform. Head moderate. Muzzle obtuse. Eye very large. Mouth small. A series of small teeth in both jaws, none on palate. Gill opening wide, not very high. Gill rakers moderate. No scales. Dorsal and anal very long, latter longer, both nearly reaching caudal. Paired fins moderate.

ANALYSIS OF SPECIES

<u>1</u>		
<u>a.</u>	D. 50 to 52; A. 67 to 76.	<u>macrops.</u>
<u>2</u>		
<u>a.</u>	D. 66; A. 85.	<u>affinis.</u>

Leptoderma macrops Vaillant

Leptoderma macrops VAILLANT, Compt. Rend. Acad. Sci. Paris, vol.103, 1886, p.1239. Talisman dredgings; Expéd. Sci. Travailleur et Talisman, Poiss., 1888, p.166, pl.13, figs.2, a - g (coasts of Morocco, 1163 to 1235 meters; coasts of Soudan, 1139 meters; Banc d' Arguin, 1495 to 2330 meters). - GOODE and BEAN, Oceanic Ichth., 1895, p.49, pl.15, fig.56 (compiled).

Depth  $9 \frac{4}{5}$  to  $11 \frac{3}{4}$  (?); head  $3 \frac{3}{4}$  (?) to 5, width  $2 \frac{2}{5}$  to  $2 \frac{3}{4}$  (?). Snout 3 to  $3 \frac{1}{2}$  (?) in head to eye; orbit  $2 \frac{3}{4}$  to 3; eye  $3 \frac{3}{5}$  to  $4 \frac{1}{2}$  (?),  $1 \frac{1}{5}$  to  $1 \frac{1}{4}$  in snout, 1 to  $1 \frac{3}{5}$  in interorbital; maxillary reaches front orbital edge or  $\frac{3}{4}$  to  $\frac{4}{5}$  to eye, expansion  $1 \frac{4}{5}$  to 2 in eye, length  $3 \frac{1}{8}$  to  $3 \frac{1}{2}$  in head; interorbital  $2 \frac{1}{8}$  to  $3 \frac{1}{4}$ , broad, low, depressed medially; bony interorbital  $1 \frac{3}{4}$  to  $2 \frac{1}{3}$  in eye. Gill rakers 0 + 12 to 15, lanceolate,  $2 \frac{1}{2}$  to 3 in eye; 2 to 3 times gill filaments.

Body with smooth fragile skin, easily torn. Lateral line axial along side of body, complete.



D. 50 to 52, fin rays low, fin height  $1 \frac{2}{5}$  in eye, fin origin midway between hind eye edge and caudal base; A. 67 to 76, fin height  $1 \frac{1}{5}$  in eye, fin origin at first  $\frac{2}{5}$  between snout tip and caudal base; caudal equals eye or orbit, slender; caudal peduncle very slender, long tail greatly tapering to thin narrow caudal peduncle; pectoral  $2 \frac{1}{3}$  to  $2 \frac{4}{5}$  in head; ventral  $3 \frac{1}{5}$  to  $3 \frac{3}{4}$ , inserted slightly before first third between snout tip and caudal base.

Head black. Iris slate black, pupil ivory white. Inside mouth and gill opening blackish brown. Body dark brown, blackish towards head and about belly. Fins brown, vertical ones dark.

Eastern Atlantic, Caribbean Sea, Philippines. My Atlantic examples are in poor preservation though establish the presence of the species in the Western Atlantic and Caribbean Sea. Although dredged in 1884 they appear to have been overlooked by Goode and Bean.

4459. D. 5495. Diuata Point (N.), S.  $76^{\circ}$  E., 9.4 miles (N.  $9^{\circ}$   $6' 30''$  E.  $125^{\circ}$   $00' 20''$ ), between Leyte and Mindanao. In 976 fathoms. August 2, 1909. Length 135 mm.

3556. D. 5619. March Island. (S.),  $78^{\circ}$  E., 7 miles (N.  $0^{\circ}$   $35' 14''$  E.  $127^{\circ}$   $14' 40''$ ). Molucca Passage. In 435 fathoms. November 27, 1909. Length 117 mm.

42112. U.S.N.M. (No data.) Mus. Hist. Nat. Paris (85. 230). Length 152 mm. Paratype. Very poorly preserved. 2 examples U.S.N.M. N.  $15^{\circ}$   $24' 40''$  W.  $63^{\circ}$   $31' 30''$ . In 683 fathoms. Albatross Station 2117. January 27, 1884. Length 140 (?) to 170 (?) mm. 2 examples. In very poor preservation.

Leptoderma affinis Alcock

Leptoderma affinis ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p. 182.

Bay of Bengal, off Kistna coast, in 753 fathoms; Illustrat. Zool. Investigator, Fishes, pt.7, 1900, pl.32, fig.3.

Leptoderma macrops (not VAILLANT) ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.10, 1892, p.361 (Bay of Bengal, in 753 fathoms). - GOODE and BEAN, Oceanic Ichth., 1895, p.49 (part). - ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.335 (off Madras coast in 753 fathoms).

Depth  $7 \frac{1}{3}$ ; head  $3 \frac{4}{5}$ . Snout  $3 \frac{7}{8}$  in head from snout tip; eye 3, greater than snout; maxillary apparently not reaching eye, expansion  $2 \frac{2}{5}$  in eye, length  $3 \frac{7}{8}$  in head from snout tip; a series of small teeth on premaxillary, none on maxillary or palate; interorbital low.

Skin naked. Lateral line row of pores from occiput to caudal.

D. 66, fin height  $5 \frac{1}{2}$  in total head, nearly over first fifth in anal length; A. 85, fin height  $4 \frac{1}{4}$  in head, inserted little over eye diameter in space between snout tip and caudal base; caudal  $3 \frac{1}{5}$  in head, well forked, slender lobes sharply pointed; pectoral  $3 \frac{1}{10}$ ; ventral 4.

Black, purple in spirit. Length 222 mm. (Alcock.)

## Genus ANOMALOPTERUS Vaillant

Anomalopterus VAILLANT, Compt. Rend. Acad. Sci. Paris, vol.103, 1886, p. 1239.

Type Anomalopterus pinguis VAILLANT, monotypic.

Body oblong, rather short. Head very large, half of body without caudal. Snout long. Eye very small. Maxillary large, reaches well beyond eye. Premaxillaries, dentaries and palatines with teeth. Gill opening large. No

scales. Dorsal little in advance of anal, preceded by median predorsal adipose ridge to occiput.

Anomalopterus pinguis Vaillant

Anomalopterus pinguis VAILLANT, Compt. Rend. Acad. Sci. Paris, vol.103, 1886, p.1239. Talisman dredgings; Exped. Sci. Travailleur et Talisman, Poiss., 1888, p.160, pl.11, figs.4 - a (off Morocco, 1400 meters). - GOODE and BEAN, Oceanic Ichth., 1895, p.49, pl.15, fig.54 (compiled).

Depth  $3 \frac{2}{3}$ ; head 2. Snout  $2 \frac{4}{5}$  in head; eye  $14 \frac{1}{2}$ , 6 in snout; maxillary reaches  $1 \frac{1}{2}$  eye diameters beyond eye, expansion equals 2 eye diameters, length  $1 \frac{4}{5}$  in head; upper jaw and mandible with small teeth and stronger ones on palatines; interorbital high.

Lateral line axial, complete.

D. 17, fin height  $4 \frac{4}{5}$  in head; A. 14, fin height  $3 \frac{1}{3}$ , origin at first  $\frac{2}{5}$  of dorsal base; caudal  $2 \frac{1}{3}$ , deeply emarginate; least depth of caudal peduncle  $4 \frac{7}{8}$ ; pectoral  $3 \frac{1}{2}$ ; ventral  $3 \frac{2}{5}$ .

Bluish. Iris white. Length 60 mm. (Vaillant.)

Eastern Atlantic.

Genus AULASTOMATOMORPHA Alcock

Aulastatomorpha ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.6, 1890, p.307.

Type Aulastatomorpha phospherops ALCOCK, monotypic. Aulastatomorpha ALCOCK, Cat. Deep Sea Fishes Indian Mus., 1899, p.178. Type Aulastatomorpha phospherops ALCOCK.

(?) Triurus LACÉPÈDE, Hist. Nat. Poiss., vol.2, 1800, p.200. Type Triurus bougainvillianus LACÉPÈDE, monotypic.

(?) Pomatius SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 559. Type Triurus bougain-

villianus LACEPÈDE, monotypic.

Body elongate, compressed, with short or little distinct caudal peduncle. Head rather long, subconic. Snout extended, tube like. Eyes large, prominent. Mouth small, terminal on tubular snout, upper jaw edge formed by premaxillary and maxillary. Teeth uniserial, in jaws only. Nostrils high, above front orbital angle. Gill opening wide below, contracted above but not extending above pectoral fin. Gill rakers well developed. Pseudobranchiae nearly rudimentary. Branchiostegals 5. Scales minute, hardly imbricate. Head naked. Dorsal short, posterior on tail. Anal long. Caudal small, forked. Paired fins small.

Rather small deep sea fishes of the Indian Ocean, known chiefly by their tube like snout with the small terminal mouth. Triurus Lacépède, described with a single tooth in each jaw, though the ventrals not mention is likely synonymous or closely allied. Its imperfectly known genotype is known as follows:

Triurus bougainvillianus Lacépède

Triurus bougainvillianus LACEPÈDE, Hist. Nat. Poiss., vol.2, 1800, pp. 200, 201. Mer du Sud (entre le 26 et le 27 ° S. L. 103 ou du 104 ° Long.)

Tail compressed, much deeper than wide. Head compressed, somewhat flattened above; snout prolonged, tubular, narrow; eyes very large; mouth terminal on snout, round, perhaps not closing; at bottom of tubular mouth 2 bony jaws, each with single sharp triangular tooth, no teeth on palate or tongue. Branchiostegals 5.

Scales very small, imbedded.

D. 15, advanced  $\frac{1}{3}$  of length; A. 15; caudal very short, rays about 20; pectoral small, weak, transparent, rays 12 or 13.

Reddish brown, silvery on head, white wine-colored on sides, lower part of body and tail. Glittering white blotch behind pectoral base. Iris golden or silvery. Length not given. (Lacépède.)

#### ANALYSIS OF SPECIES

- 1  
a. Maxillary reaches  $2\frac{2}{5}$  to eye; depth 9; D. 18. caeruliceps.
- 2  
a. Maxillary reaches  $3\frac{1}{5}$  to eye; depth  $5\frac{3}{5}$ ; D.21.

phospherops.

#### Aulastomatomorpha caeruliceps Lloyd

Aulastomatomorpha caeruliceps LLOYD, Ann. Mag. Nat. Hist., series 7, vol.18, 1906, p.308. Gulf of Oman, off Muscat, in 1005 fathoms.

Aulastomorpha caeruliceps LLOYD, Illustrat. Zool. Investigator, Fishes, pt.9, 1908, pl.42, fig.3; Mem. Indian Mus., vol.2, No.3, Aug.1909, p.148 (type).

Depth 9; head 3. Snout  $2\frac{1}{8}$  in head; eye  $4\frac{1}{3}$ , 2 in snout; maxillary reaches  $2\frac{2}{5}$  to eye, length  $5\frac{1}{5}$  in head; interorbital low.

Scales very fine.

Dorsal 18, origin over middle of anal base, fin height  $7\frac{1}{3}$  in head; A. 40, base long as head, fin height  $7\frac{1}{4}$ ; caudal 3, deeply emarginate; least depth of caudal peduncle  $5\frac{1}{4}$ ; pectoral  $5\frac{2}{3}$  (?), ventral 8.

Dark slaty blue on head, rest of body brownish black. Bases of fins with blue tinge. Length 180 mm. (Lloyd.)

Indian Ocean.

Aulastomatomorpha phospherops Alcock

Aulastomatomorpha phospherops ALCOCK, Ann. Mag. Nat. Hist., series 6, vol.6, 1890, p. 307. Off Elicapeni Bank, Laccadive Sea (N. Lat.  $11^{\circ} 12' 47''$  E. Long.  $74^{\circ} 25' 30''$ ), in 1000 fathoms; series 6, vol.7, 1891, p.10, fig.1.

Aulastomatomorpha phosphorops ALCOCK, Illustrat. Zool. Investigator, Fishes, pt.1, 1892, pl.5, fig.2. - GOODE and BEAN, Oceanic Ichth., 1895, pp.50, 510 (compiled). - LLOYD, Mem. Indian Mus., vol.2, No.3, 1909, p.148 (Bay of Bengal off Arakan coast, 1100 fathoms).

Aulastomomorpha phosphorops ALCOCK, Journ. Asiatic Soc. Bengal, vol.65, pt.2, 1896, p.335 (compiled); Cat. Deep. Sea Fishes Indian Mus., 1889, p.178 (Arabian Sea, near the Laccadives, 1000 fathoms).

Depth  $5 \frac{3}{5}$ ; head 3. Snout  $2 \frac{1}{6}$  in head; eye  $5 \frac{1}{4}$ ,  $2 \frac{1}{3}$  in snout; maxillary reaches  $3 \frac{1}{5}$  to eye, expansion  $2 \frac{3}{5}$  in eye, length  $6 \frac{1}{5}$  in head; minute, acute, recurved uniserial teeth in premaxillaries and dentaries, no teeth on maxillary; interorbital low. Gill rakers moderately long.

Body covered with minute, hardly imbricate, cycloid scales. Lateral line axial, complete.

D. 21, origin slightly behind middle of anal base, fin height  $5 \frac{7}{8}$  in head; A. 41, fin height  $4 \frac{3}{4}$ ; caudal  $2 \frac{1}{8}$ , deeply forked, with 14 to 18 rudimentary rays well advanced; least depth of caudal peduncle  $4 \frac{1}{2}$ ; pectoral  $3 \frac{1}{6}$ ; ventral  $4 \frac{1}{3}$ .

Head snow white. Iris black. Mouth, gill chamber and peritoneum intense black. Body chocolate. Fins blackish gray. Length 280 mm. (Alcock)

Indian Ocean.

## Genus DOLICOPTERYX Brauer

Dolicopteryx BRAUER, Sitz. Ber. Gesell. Nat. Marburg, vol.8, 1901, p.127.

Type Dolicopteryx anascopa BRAUER, monotypic.

Dolichopteryx BEEBE, Zoologica New York Zool. Soc., vol.13, No.4, March 1932,

p.49. Type Dolicopteryx anascopia BRAUER.

Body elongate, slender, nearly cylindrical. Head large, flattened. Snout long. Eye rather large, telescopic, nearly median. Mouth small terminal. Maxillary short. Gill opening broad. No scales. Dorsal and anal well posterior, near caudal, former little advanced. Paired fins long in young, ventral shorter and more posterior with age. Caudal well emarginate.

## ANALYSIS OF SPECIES

1		
<u>a.</u>	Depth 12.	<u>longipes.</u>
2		
<u>a.</u>	Depth 17.	<u>binocularis.</u>

Dolicopteryx longipes (Vaillant)

Aulostoma (?) longipes VAILLANT, Exped. Sci. Travailleur et Talisman, Poiss., 1888, p.340, pl.27, fig.4. Off Morocco, 1163 meters. - GOODE and BEAN, Oceanic Ichth., 1896, p.484, pl.117, fig.397 (compiled).

Dolicopteryx longipes NORMAN, Discovery Rep., vol.2, 1930, p.271, fig.3 (S. 33° 50' to 34° 13' E. 16° 4' to 15° 49', 350 to 400 meters; N. 5° 30' 30" W. 17° 45', 2500 to 2700 meters).

Dolicopteryx anascopa BRAUER, Sitz. Ber. Gesell. Nat. Marburg, vol.8, 1901, p.127. West of Cocos Island, Indian Ocean (S. Lat. 10° 8' 2" E. Long. 97° 14' 9"), in 2400 meters; Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee - Fische, 1906, p.24, fig.4 (type).

Depth  $10 \frac{2}{3}$  to 12; head  $4 \frac{1}{5}$  to  $4 \frac{1}{2}$ . Snout  $2 \frac{1}{5}$  in head measured from snout tip to eye; orbit 3; eye  $4 \frac{1}{5}$  in snout; mouth cleft 3 in snout measured to orbit; minute teeth present, at least in upper jaw; interorbital low.

D. 15 (?), inserted slightly behind ventral base, fin base  $2 \frac{7}{8}$  in total head; A. 12, inserted below middle of dorsal base, fin base  $3 \frac{1}{8}$ ; caudal damaged, evidently deeply emarginate, rudimentary rays 7 above and 6 below; least depth of caudal peduncle  $4 \frac{3}{4}$  in total head length; pectoral rays 14, third ray widest, fin  $2 \frac{1}{3}$  in body without caudal; ventral rays 12, length  $3 \frac{1}{5}$  in total head length. Length 120 mm. (Norman.)

Atlantic and Indian Oceans. Brauer's figure shows a smaller example, only 35 mm. long, with the ventral nearly long as pectoral and reaching back far as end of caudal, its origin slightly nearer pectoral origin than caudal base.

Dolichopteryx binocularis Beebe

Dolichopteryx binocularis BEEBE, Zoologica, N.Y. Zool. Soc., vol.13, No.4, March 1932, p.49, fig.8. Fourteen miles southeast of Nonsuch, Bermuda, 400 fathoms. - Zoologica, N.Y. Zool. Soc., vol.16, No.2, Aug.1933, P. 59, fig.16. (Same specimen, osteology.)



## Family ARGENTINIDAE

Body elongate, abdomen rounded. Mouth terminal, small or large. Maxillary forms lateral edge of upper jaw, with supplemental bone. Premaxillaries not protractile. Teeth various, sharp pointed. Pterygoids toothed. No barbels. Gill membranes separate from isthmus. Gills 4, slit after fourth. Branchiostegals 5 to 10. Stomach blind sac, with few or no appendages. Air vessel single, large. Ova large, fall into abdominal cavity before exclusion. Scales moderate or small, usually cycloid. Head naked. Lateral line present. No photophores. Dorsal short, nearly median. Adipose fin always present. Anal moderate. Caudal forked. Pectoral low. Ventral moderate, nearly median.

Small marine fishes, many ascending streams in the spawning season. They are reduced salmonoids, smaller and weaker than trout, from which they differ otherwise largely in the stomach. Most are excellent food fishes. Included here are only the deep water forms belonging to the genus Bathylagus.

## Genus BATHYLAGUS Günther

Bathylagus GÜNTHER, Ann. Mag. Nat. Hist., London, ser.5, vol.2, 1878, p.248.

Type Bathylagus antarcticus GÜNTHER, designated by JORDAN, Genera of Fishes, pt.3, 1919, p.395.

Body oblong, compressed. Head short, compressed, bones thin and membranaceous. Eye large. Mouth narrow, transverse, anterior. Upper teeth very feeble or rudimentary, lower very small, on jaw edges forming fine serrature. Series of minute teeth across vomer and along each palatine. Gill opening narrow, begins opposite pectoral base and extends across isthmus. Gill membranes united, free from isthmus. Gill rakers lanceolate, rather long. Gills

small. Pseudobranchiae well developed. Scales moderate, thin, deciduous. Dorsal small. median. Adipose fin present. Anal posterior moderate or long. Caudal forked. Paired fins well developed, ventral opposite dorsal.

## ANALYSIS OF SPECIES

- 1  
a. Head 4 to 5.
- 1  
b. Dorsal origin nearer snout tip than caudal base.
- 1  
2  
c. Anal 13; depth  $4 \frac{1}{4}$  atlanticus.
- 2  
c. Anal 16 to 25; depth 5 to  $7 \frac{1}{3}$ .
- 1  
2  
d. Eye  $2 \frac{3}{5}$  in head; head  $5 \frac{1}{4}$  to  $5 \frac{1}{3}$  microcephalus.
- 2  
d. Eye 2 to  $2 \frac{1}{2}$  (rarely  $2 \frac{3}{5}$ ; head 4 to  $4 \frac{2}{3}$ .
- 1  
e. Anal origin  $2 \frac{2}{3}$  to  $3 \frac{1}{5}$  times as distant from snout end as from caudal base; anal fin base  $4 \frac{1}{2}$  to nearly 6 in fish.
- 1  
f. Depth 6 to  $7 \frac{1}{3}$ ; Anal 18 to 21.
- 1  
g. Depth 6 to  $6 \frac{1}{4}$ ; head  $4 \frac{1}{8}$  to  $4 \frac{1}{3}$ ; interocular  $2 \frac{3}{4}$  to 3; dorsal origin nearer adipose fin than snout end glacialis.
- 2  
2  
g. Depth 7 to  $7 \frac{1}{3}$ ; head  $4 \frac{1}{4}$  to  $4 \frac{3}{5}$ ; interocular 4 or more in head; dorsal origin equidistant between snout end and adipose fin gracilis.
- 2  
f. Depth 5 to  $5 \frac{3}{4}$ ; Anal usually 19 to 25.
- 1  
h. Head  $4 \frac{1}{3}$  to  $4 \frac{3}{5}$ ; eye  $2 \frac{1}{5}$  to  $2 \frac{1}{2}$  equals or less than post-orbital; Anal 22 to 25, base length  $4 \frac{1}{2}$  to  $5 \frac{1}{5}$  in fish antarcticus.
- 2  
h. Head  $4 \frac{1}{5}$  to  $4 \frac{1}{3}$ ; eye little over 2, greater than postorbital; Anal 19, base length  $5 \frac{3}{5}$  to  $5 \frac{2}{3}$  in fish benedicti.

- <sup>3</sup>  
h. Head 4 to 4  $\frac{1}{12}$ ; eye 2  $\frac{1}{4}$  to 2  $\frac{1}{2}$ ; Anal 19 (16).  
pacificus.
- <sup>2</sup>  
e. Anal origin 3  $\frac{1}{3}$  to 3  $\frac{3}{5}$  times as distant from snout end as caudal  
 base; Anal base 6  $\frac{1}{4}$  to 6  $\frac{2}{3}$  in fish europyts.
- <sup>2</sup>  
b. Dorsal origin nearer caudal base than snout end.  
<sup>1</sup>  
i. Dorsal 12; Anal 13; occipital region normal.  
<sup>1</sup>  
j. Eye 2  $\frac{1}{2}$  to 2  $\frac{3}{4}$  in head argyrogastrer.  
<sup>2</sup>  
j. Eye 3 to 3  $\frac{2}{3}$  in head nigrigenys.  
<sup>2</sup>  
i. Dorsal 8; Anal 24; occipital region swollen, with median keel  
<sup>2</sup>  
a. Head 3; Dorsal 9, origin nearer caudal base than snout tip milleri.  
longiceps.

Bathylagus atlanticus Günther

Bathylagus atlanticus GÜNTHER, Ann. Mag. Nat. Hist., London, ser.5, vol.2, 1878,  
 p.248. South Atlantic, 2040 fathoms; Rep. Voy. Challenger, vol.22, 1887,  
 p.219 (type). - GOODE and BEAN, Oceanic Ichth., 1895, p.54 (compiled). -  
 HOLT and BYRNE, Dep. Agric. Ireland Fisher. Sci. Investig., No.2, 1905,  
 p.6, pl.1, figs.3 - 4 (off County Mayo, western Ireland). - NORMAN, Discovery  
 Rep., vol.2, 1930, p.274 (type; (?) off south west Ireland; N. 50° 57' <sup>o</sup>  
 W. 11° 38' <sup>o</sup>, 700 fathoms).

Depth of body 4  $\frac{1}{4}$  in the length, length of head a little more than 4.  
 Diameter of eye 2  $\frac{1}{8}$  in length of head, interocular width 3  $\frac{1}{5}$ , interorbital  
 width 5  $\frac{1}{3}$ . Dorsal 9; origin nearer to end of snout than base of caudal.  
 Anal 13; origin nearer to base of caudal than insertion of pelvic, 3  $\frac{3}{5}$  times  
 as distant from end of snout as from base of caudal; length of base 7  $\frac{2}{3}$  in

in that of fish. Pelvics 8-rayed, inserted below last ray of dorsal. About 36 scales in longitudinal series. (Norman.)

89919 U.S.N.M. N.  $33^{\circ} 50'$  W.  $63^{\circ} 55'$ . Museum of Comparative Zoology. Length 39 mm.

Bathylagus microcephalus Norman

Bathylagus microcephalus NORMAN, Discovery Rep., vol.2, 1930, p.274, fig.5 (outline). S.  $33^{\circ} 50'$  to  $34^{\circ} 13'$  E.  $16^{\circ} 4'$  to  $15^{\circ} 49'$ , 859 to 950 meters.

Depth of body 6 to  $6 \frac{1}{5}$  in the length, length of head  $5 \frac{1}{4}$  to  $5 \frac{1}{3}$ . Diameter of eye  $2 \frac{3}{5}$  in length of head, interocular width nearly 3, interorbital width  $5 \frac{1}{4}$ . Dorsal 10 - 11; origin much nearer to end of snout than base of caudal, equidistant from former and adipose fin. Anal 20 - 22; origin about equidistant from base of caudal and insertion of pelvic,  $2 \frac{5}{6}$  to  $3 \frac{1}{5}$  times as distant from end of snout as from base of caudal; length of base 5 to  $5 \frac{2}{3}$  in that of fish. Pelvics 10 rayed, inserted below middle or posterior part of dorsal. About 42 scales in longitudinal series. (Norman.)

Bathylagus glacialis Regan

Bathylagus glacialis REGAN, Trans. Roy. Soc. Edinburgh, vol.49, pt.2, No.2, May 23, 1913, p.231, pl.9, fig.2. S.  $68^{\circ} 25'$  W.  $27^{\circ} 10'$ , 1000 fathoms; S.  $68^{\circ} 32'$  W.  $12^{\circ} 49'$ , 800 fathoms; S.  $71^{\circ} 50'$  W.  $23^{\circ} 30'$ , 1000 fathoms; S.  $71^{\circ} 22'$  W.  $16^{\circ} 34'$ , 1410 fathoms; S.  $71^{\circ} 32'$  W.  $17^{\circ} 15'$ , 1221 fathoms. - NORMAN, Discovery Rep., vol.2, 1930, p.275 (S.  $33^{\circ} 25'$  E.  $6^{\circ} 31'$ , 1000 meters; S.  $41^{\circ} 33'$  W.  $17^{\circ} 58'$ , 112 meters; S.  $46^{\circ} 56'$  W.  $46^{\circ} 3'$ , 1050 to 1350 meters; types).

Depth of body 6 to  $6 \frac{1}{4}$  in the length, length of head  $4 \frac{1}{8}$  to  $4 \frac{1}{3}$ . Diameter of eye  $2 \frac{1}{6}$  to  $2 \frac{1}{4}$  in length of head, interocular width  $2 \frac{3}{4}$  to 3, interorbital width about 6. Dorsal 10; origin nearer to end of snout than base of caudal, but nearer to adipose fin than end of snout. Anal 18 - 21; origin equidistant from base of caudal and insertion of pelvic or a little nearer the latter,  $2 \frac{3}{4}$  to  $3 \frac{1}{5}$  times as distant from end of snout as from base of caudal; length of base nearly 6 times in that of fish. Pelvics 8 or 9 rayed, inserted below middle of dorsal. 36 to 40 scales in a longitudinal series. (Norman.)

Bathylagus gracilis Lönnberg.

Bathylagus gracilis Lönnberg, Wiss. Ergebn. Schwed. Südpolar - Exped., vol.6, No.6, 1908, p.68. S.  $63^{\circ} 24'$  W.  $45^{\circ} 40'$ , 2800 meters; S.  $49^{\circ} 56'$  W.  $49^{\circ} 56'$ , 2700 meters. - NORMAN, Discovery Rep., vol.2, 1930, p. 276 (S.  $41^{\circ} 43' 20''$  W.  $42^{\circ} 20' 40''$ , 2000 meters; S.  $39^{\circ} 50' 30''$  W.  $36^{\circ} 23'$ , 1500 meters; S.  $53^{\circ} 25'$  W.  $35^{\circ} 15'$ , 1025 to 1275 meters; S.  $54^{\circ} 51' 24''$  W.  $31^{\circ} 20' 12''$ , 750 to 1000 meters; S.  $54^{\circ} 19' 30''$  W.  $30^{\circ} 31' 30''$ , 780 to 1000 meters).

Closely related to *B. glacialis*, but depth of body 7 to  $7 \frac{1}{3}$  in the length, length of head  $4 \frac{1}{4}$  to  $4 \frac{3}{5}$ . Diameter of eye about twice in length of head, interocular width about 4, interorbital width  $6 \frac{1}{2}$  to  $7 \frac{1}{2}$ . Interorbital space deeply concave. Dorsal 10; origin equidistant from end of snout and adipose fin. Anal 19 - 20; origin  $2 \frac{2}{3}$  to 3 times as distant from end of snout as from base of caudal; length of base about 5 times in that of fish. 40 to 44 scales in a longitudinal series. (Norman.)

Bathylagus antarcticus Günther

Bathylagus antarcticus GÜNTHER, Ann. Mag. Nat. Hist., London, ser.5, vol.2, 1878, p.248. Antarctic, 1950 fathoms; Rep. Voy. Challenger, vol.22, 1887, p.220 (type). - GOODE and BEAN, Oceanic Ichth., 1895, p.55, (reference). - BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Tiefsee-Fische, 1906, p.12 (not fig; S.  $55^{\circ} 57' 2''$  E.  $16^{\circ} 14' 9''$ , 2000 meters; S.  $59^{\circ} 16' 3''$  E.  $40^{\circ} 13' 7''$ , 5450 meters; S.  $62^{\circ} 26' 6''$  E.  $53^{\circ} 21' 6''$ , 1500; S.  $37^{\circ} 31' 2''$  E.  $17^{\circ} 1' 6''$ , 4953 meters, between Cape Colony and Bouvet Island). - BARNARD, Ann. South African Mus., vol.21, pt.1, June 1925, p.129 (S.  $37^{\circ} 31'$  E.  $17^{\circ} 1'$ , 1000 fathoms, south of Agulhas Bank). - NORMAN, Discovery Rep., vol.2, 1930, p.276 ( S.  $43^{\circ} 20'$  W.  $46^{\circ} 2'$ , 2000 meters; S.  $33^{\circ} 50'$  to  $34^{\circ} 13'$  E.  $16^{\circ} 4'$  to  $15^{\circ} 49'$ , 850 to 950 meters; S.  $53^{\circ} 25'$  W.  $35^{\circ} 15'$ , 1025 to 1075 meters, type).

Depth of body  $5 \frac{1}{4}$  to  $5 \frac{3}{5}$  in the length, length of head  $4 \frac{1}{3}$  to  $4 \frac{3}{5}$ . Diameter of eye  $2 \frac{1}{5}$  to  $2 \frac{1}{2}$  in length of head, equal to or less than post-orbital part of head; interocular width 3 to  $3 \frac{1}{2}$ , interorbital width  $6 \frac{2}{3}$  to 7. Dorsal 9 - 11; origin nearer to end of snout than base of caudal. Anal (21) 22 - 25; origin nearer insertion of pelvic than base of caudal,  $2 \frac{2}{3}$  to  $3 \frac{1}{6}$  times as distant from end of snout as from base of caudal; length of base  $4 \frac{1}{2}$  to  $5 \frac{1}{5}$  in that of fish. Pelvics 9 or 10 rayed, inserted below middle of posterior part of dorsal. 39 - 44 scales in a longitudinal series. (Norman.)

described

Bathylagus benedicti Goode and Bean

Bathylagus benedicti GOODE and BEAN, *Oceanic Ichth.*, 1895, p.55, pl.17, fig.64, N.  $39^{\circ} 44' 30''$  W.  $71^{\circ} 4'$ , 1022 fathoms; N.  $38^{\circ} 59'$  W.  $70^{\circ} 7'$ , 1344 fathoms; N.  $40^{\circ} 29'$  W.  $66^{\circ} 4'$ , 1769 fathoms. - JORDAN and EVERMANN, *Bull. U.S.Nat. Mus.*, No.47, pt.1, 1896, p.529 (compiled). - NORMAN, *Discovery Rep.*, vol.2, 1930, p.277 (S.  $41^{\circ} 43' 20''$  W.  $42^{\circ} 20' 40''$ , 2000 meters; S.  $53^{\circ} 25'$  W.  $35^{\circ} 15'$ , 1025 to 1075 meters).

(?) Bathylagus elongatus ROULE, *Bull. Inst. Océanogr. Monaco*, No. 320, 1919, p.8. (Cap Finisterre); *Res. Camp. Sci. Monaco*, vol.52, 1919, p.22, pl.1, fig.2. (Same specimen.)

Very close to the preceding species. Depth 5 to  $5 \frac{3}{5}$  in the length, length of head  $4 \frac{1}{5}$  to  $4 \frac{1}{3}$ . Diameter of eye a little more than 2 in head, greater than postorbital part of head; interocular width  $2 \frac{2}{3}$  to nearly 3, interorbital width  $5 \frac{2}{3}$  to 6. Dorsal 9 or 10. Anal about 19; origin 3 to  $3 \frac{1}{5}$  times as distant from end of snout as from base of caudal; length of base  $5 \frac{3}{5}$  to  $5 \frac{2}{3}$  in that of fish. (Norman.)

33510 U.S.N.M. N.  $39^{\circ} 44' 30''$  W.  $71^{\circ} 4'$  Albatross Station 2094. September 21, 1883. Length 155 mm. Type.

35615 U.S.N.M. N.  $39^{\circ} 39' 45''$  W.  $71^{\circ} 35' 15''$ . August 19, 1884. In 538 fathoms. Length 91 to 88 mm. Albatross Station 2201. 2 examples.

39480 U.S.N.M. N.  $40^{\circ} 29'$  W.  $66^{\circ} 4'$ . In 1767 fathoms. Albatross Station 2572. Length 105 mm.

44579 U.S.N.M. N.  $38^{\circ} 59'$  W.  $70^{\circ} 07'$ . In 1544 fathoms. Albatross Station 2711. September 16, 1886. Length 138 mm. (?)

Bathylagus pacificus Gilbert

Bathylagus pacificus GILBERT, Proc. U.S. Nat. Mus., vol.13, 1890, p.55. Albatross

Stations 3071 and 3074, 685 to 877 fathoms, off Washington. - GOODE and BEAN, Oceanic Ichth., 1895, pp.53, 510 (reference). - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No. 47, pt.1, 1896, p.530 (compiled). - GILBERT, Proc. U.S. Nat. Mus., vol.48, 1915, p.312 (off southern California). - NORMAN, Discovery Rep., vol.2, 1930, p.277 (compiled).

Bathylagus borealis GILBERT, Rep. U.S. Fish Comm., pt.19, 1893 (1895), p.402.

Albatross Stations 3327 and 3325, 284 to 232 fathoms, north of Unalaska Island. - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No.47, pt.3, 1898, p. 2824.

Depth 6 to  $6 \frac{3}{4}$ ; head  $3 \frac{7}{8}$  to 4, width  $2 \frac{1}{8}$  to  $2 \frac{1}{5}$ . Snout (in profile)  $4 \frac{1}{2}$  to  $6 \frac{1}{2}$  in head from snout tip; eye  $2 \frac{3}{4}$  to  $2 \frac{7}{8}$ , greatly exceeds snout or interorbital; maxillary reaches  $\frac{1}{8}$  to  $\frac{1}{5}$  in eye, length 4 to  $4 \frac{1}{4}$  in head from snout tip; interorbital, rather low, with deep median concave depression. Gill rakers 11 + 18, slender, flexible, 3 in eye, little greater than gill filaments.

Scales 38 to 40 (?) (pockets) in lateral line to caudal base; 4 above, 4 below, 14 (?) predorsal. Scales all fallen.

D. I, 8 or I, 9 (damaged), fin height 2 (?) to  $2 \frac{1}{2}$  (?) in total head length; adipose fin  $4 \frac{1}{4}$ , over hind anal rays; A.I, 16 (damaged), fin height  $3 \frac{1}{8}$  (?) to  $3 \frac{3}{5}$  (?); caudal (damaged) small, with small though distinct rudimentary rays, at least 10 below; least depth of caudal peduncle (5); pectoral (damaged)  $2 \frac{1}{4}$  (?) to  $2 \frac{3}{4}$ ; ventrals  $3 \frac{1}{8}$  to  $3 \frac{1}{5}$  (?) (damaged), inserted below bases of last dorsal rays.



breast neutral black. Fins dusky to blackish.

Pacific Ocean.

48681 U.S.N.M. N.  $53^{\circ} 37' 10''$  W.  $167^{\circ} 50' 10''$ . In 284 fathoms. August 20, 1890. Albatross Station 3325. Length 150 mm.

53943 U.S.N.M. N.  $55^{\circ} 20'$  W.  $136^{\circ} 20'$ . In 1569 fathoms. August 29, 1888. Albatross Station 2859. Length 104 to 191 mm. poorly preserved.

76491 U.S.N.M. N.  $55^{\circ} 6'$  W.  $169^{\circ} 8'$ . August 5, 1895. Albatross Station 3601. Length 134 mm., poorly preserved.

76492 U.S.N.M. N.  $54^{\circ} 54'$  W.  $168^{\circ} 59'$ . August 12, 1895. Albatross Station 3604. Length 130 (?) mm., caudal broken off.

77473 U.S.N.M. N.  $32^{\circ} 44' 00''$  W.  $119^{\circ} 32' 00''$ . April 13, 1895. Albatross Station 3627. Length 116 mm. (?).

77474 U.S.N.M. Point Pinos Light House, S.  $50^{\circ}$  E., 10.9 miles, Monterey Bay, California. June 2, 1904. Albatross Station 4544. Length 156 mm.

77475 U.S.N.M. Point Pinos Light House, S.  $6^{\circ}$  E., 4.6 miles, June 7, 1904. Albatross Station 5440. Length 168 mm.

74716 U.S.N.M. "Bowers Bank," Dering Sea. June 3, 1906. Albatross Station 4767. Length 31 mm.

Bathylagus euryops Goode and Bean

Bathylagus euryops GOODE and BEAN, Oceanic Ichth., 1895, p.55, pl.17, fig.63.

N.  $39^{\circ} 29'$  W.  $71^{\circ} 46'$ , 693 fathoms; N.  $39^{\circ} 52'$  W.  $70^{\circ} 30'$ , 600 fathoms; N.  $40^{\circ} 9' 30''$  W.  $67^{\circ} 9'$ , 1356 fathoms. - JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No 47, pt.1, 1896, p.529 (compiled). - (?) HOLT and

BYRNE, Dep. Agric. Ireland Fisher. Scient. Investig., No.2, 1912, (1913), p.24, fig.10, (off Ireland, 400 to 900 fathoms). - NORMAN, Discovery Rep., vol.2, 1930, p.277 (S.  $33^{\circ} 50'$  to  $34^{\circ} 13'$  E.  $16^{\circ} 4'$  to  $15^{\circ} 49'$ , 850 to 950 meters; S.  $60^{\circ} 48' 50''$  W.  $51^{\circ} 00' 20''$ , 1000 to 1100 meters; S.  $38^{\circ} 20'$  W.  $22^{\circ} 18'$ , 1800 to 2000 meters).

Bathylagus euryops var. latifrons LÖNNBERG, Wiss. Ergebn. Schwed. Südpolar - Exped., vol.5, No.6, 1905, p.67. S.  $49^{\circ} 56'$  W.  $49^{\circ} 56'$ , 2700 meters.

(?) Bathylagus atlanticus (not GÜNTHER) HOLT and BYRNE, Dep. Agric. Ireland Fisher. Scient. Investig., No.2, 1905, p.6, pl.1, figs. 3 - 4.

Depth of Body  $5 \frac{1}{3}$  to  $6 \frac{1}{2}$  in the length, length of head  $4 \frac{1}{4}$  to  $4 \frac{2}{3}$ . Diameter of eye  $2 \frac{1}{3}$  to  $2 \frac{3}{5}$  in length of head, interocular width  $3 \frac{1}{5}$  to  $3 \frac{1}{3}$ , interorbital width about 6. Dorsal 9 - 10; origin a little nearer to end of snout than base of caudal. Anal 16 - 18; origin nearer base of caudal than insertion of pelvic,  $3 \frac{1}{3}$  to  $3 \frac{3}{5}$  times as distant from end of snout as from base of caudal; length of base  $6 \frac{1}{4}$  to  $6 \frac{2}{3}$  in that of fish. Pelvics 8 - 9 rayed, inserted below middle or posterior part of dorsal. 37 to 41 scales in a longitudinal series. (Norman.)

31861 U.S.N.M. N.  $39^{\circ} 52'$  W.  $70^{\circ} 30'$ . Fish Hawk Station 1155 haul. 1882. In 554 fathoms. Type. Length 110 (?) mm.

35420 U.S.N.M. N.  $39^{\circ} 29'$  W.  $71^{\circ} 46'$ . In 693 fathoms. Albatross Station 2181. July 23, 1884. Length 140 mm.

39477 U.S.N.M. N.  $40^{\circ} 9' 30''$  W.  $67^{\circ} 9'$ . In 1356 fathoms. Albatross Station 2571. Length 88 (?) mm. Type.

Bathylagus argyrogaster Norman

Bathylagus argyrogaster NORMAN, Discovery Rep., vol.2, 1930, p.273, fig.4

(outline). S.  $18^{\circ} 37'$  E.  $10^{\circ} 46'$ , 73 meters; S.  $15^{\circ} 55'$  E.  $10^{\circ} 35'$ , 600 to 700 meters; S.  $5^{\circ} 54'$  E.  $11^{\circ} 19'$ , 150 meters; S.  $2^{\circ} 13'$  E.  $1^{\circ} 52'$ , 71 meters; S.  $2^{\circ} 43' 30''$  W.  $00^{\circ} 56' 30''$ , 125 to 175 meters; S.  $00^{\circ} 56'$  W.  $14^{\circ} 8' 30''$ , 125 to 175 meters; S.  $00^{\circ} 56'$  W.  $14^{\circ} 8' 30''$ , 250 meters.

Depth of body  $4 \frac{2}{3}$  to  $5 \frac{1}{2}$  in length, length of head  $3 \frac{4}{5}$  to  $4 \frac{1}{5}$ . Diameter of eye  $2 \frac{1}{2}$  to  $2 \frac{3}{4}$  in length of head, interocular width about 3, interorbital width about 5. Dorsal 12; origin equidistant from base of caudal and anterior part or middle of eye. Anal 14 - 15 (? 16); origin about equidistant from base of caudal and insertion of pelvic or nearer the latter,  $3 \frac{1}{4}$  to 4 times as distant from end of snout as from base of caudal; length of base 7 to nearly 8 times in that of fish. Pelvics 8 rayed, inserted below middle of dorsal. About 39 scales in a longitudinal series. Brownish above, silvery below; operculum silvery black.

Bathylagus nigrigenys Parr

Bathylagus nigrigenys PARR, Bull. Bingham Oceanogr. Collection, vol.2, art.4, Oct. 1931, p.4, fig.2. N.  $20^{\circ} 48' 15''$  W.  $106^{\circ} 11' 50''$ , 540 fathoms; N.  $16^{\circ} 14'$  W.  $99^{\circ} 36' 30''$ , 625 fathoms.

Depth  $4 \frac{7}{8}$ ; head 4. Snout to eye  $4 \frac{1}{3}$  in head; eye 4, greater than snout; orbit  $3 \frac{1}{3}$ ; maxillary scarcely more than half way to eye; mouth small, almost entirely transverse; premaxillary teeth minute, dentaries with fairly well developed teeth, irregular group at front end of vomer. Gill rakers 2.

Scales 40 to 45 (?) in lateral series.

D. 11 or 12, fin height  $2 \frac{1}{3}$  in head; adipose fin  $1 \frac{2}{3}$ ; A. 14 to 17, fin height  $2 \frac{4}{5}$ ; caudal length  $1 \frac{7}{8}$ ; least depth of caudal peduncle  $3 \frac{1}{8}$ ; pectoral  $1 \frac{2}{3}$ , rays 10; ventral rays 8 to 10, fin  $1 \frac{2}{5}$  in head.

Dorsal surface of head, upper half of trunk and tail uniform dusky brown, lower surfaces pale. Inside mouth and gill cavity, also peritoneum, black. Length 82.5 mm. without caudal. (Parr)

Pacific off Mexico.

Bathylagus milleri Jordan and Evermann

Bathylagus milleri (JORDAN and GILBERT) JORDAN and EVERMANN, Bull. U.S. Nat. Mus., No. 47, pt.3, 1898, p.2825. Cortez Banks off San Diego, California, Albatross Station 3627, 776 fathoms. - NORMAN, Discovery Rep., vol.2, 1930, p.274 (compiled).

48919 U.S.N.M. N.  $32^{\circ} 44'$  W.  $119^{\circ} 32'$ . In 776 fathoms.

Albatross Station 3627. April 13, 1896. Length 173 (?) mm. Type of  
Bathylagus milleri.

Bathylagus longiceps Parr

Bathylagus longiceps PARR, Bull. Bingham Oceanogr. Collection, vol.2, art.4,  
Oct.1931, p.6, fig.3. N.  $22^{\circ} 50' 20''$  W.  $109^{\circ} 48' 15''$ , 525 fathoms;  
N.  $24^{\circ} 7'$  W.  $108^{\circ} 40'$ , 286 fathoms.

Depth  $5 \frac{2}{3}$ ; head 3. Snout 3 in head to eye; eye  $6 \frac{1}{2}$ ,  $2 \frac{1}{8}$  in snout;  
orbit  $3 \frac{1}{8}$ ; maxillary reaches eye, length  $2 \frac{7}{8}$  in head from snout tip;  
single row of very fine teeth in premaxillaries and dentaries, conspicuously  
longer in latter; 2 (?) transverse series of 4 minute teeth across vomer and  
series of very minute teeth on each palatine.

D. 9, fin height  $4 \frac{1}{10}$  in total head length; adipose fin 3; A. 12, fin  
height  $3 \frac{1}{2}$ ; caudal 2; least depth of caudal peduncle  $3 \frac{3}{4}$ ; ventral 2,  
rays 8.

Back dotted with very coarse black pigmentation, ventral surfaces pale.  
Inside mouth and gill openings, also peritoneum, black. Length 42 mm. without  
caudal. (Parr.)  
Off Cape San Lucas.

~~caudal.~~ (Parr.)

~~Off Cape San Lucas.~~

#### Family SERPIDAE

Body elongate, subterete. Head moderate or small. Mouth very small, terminal. Teeth small, chiefly in lower jaw and on vomer. Gill membranes separate. Branchiostegals reduced to 3 or 4. Dorsal fin short, posterior. Adipose fin present. Ventrals behind middle of body.

#### Genus SERPE Risso

Serpe (BLOCH) RISSO, Ichth. Nice, 1810, p.356. Type Serpe microstoma RISSO, monotypic.

Microstoma CUVIER, Règne Animal, vol. 2, 1817, p.184. Type Serpe microstoma RISSO, monotypic.

Body cylindrical. Eye very large. Mouth cleft very small. Maxillaries very short, broad. Narrow series of fine, small teeth in lower jaw and across head of vomer. No other teeth. Pseudobranchiae well developed. Air vessel large. Mucous membrane of stomach with numerous large papillae. No pyloric appendages. Body covered with large, thin, silvery scales. Scales extend over central caudal rays. Dorsal fin short, inserted behind ventrals, before anal. Adipose fin present in most young examples, frequently absent with age, small, narrow, end fringed or lacerated. Caudal forked.

Marine fishes of the deeper Atlantic and Pacific Oceans.

#### Subgenus SERPE Risso

Serpe microstoma Risso

Serpe microstoma RISSO, Ichth. Nice, 1810, p.356. Nice.

Microstoma microstoma BRAUER, Deutsch. Tiefsee Exped. Valdivia, vol.15, Fische, 1906, p.10; fig.1 (enterion) (S.  $3^{\circ} 31'$  E.  $7^{\circ} 25' 6''$ , 600 meters, Gulf of Guinea)..

Microstoma rotundata RISSO, Hist. Nat. Eur. Mérid., vol.3, 1826, p.475, fig.36. Nice. - GÜNTHER, Cat. Fishes Brit. Mus., vol.6, 1866, p.204 (Messina; Mediterranean).

Microstoma argenteum VALENCIENNES, Hist. Nat. Poiss., vol.18, 1846, p.358, pl.544. Nice, Sardinia, Messina.

Depth  $8 \frac{2}{3}$ ; head  $3 \frac{3}{4}$ , width  $2 \frac{1}{3}$ . Snout  $4 \frac{1}{10}$  to 5 in head from snout eye  $2 \frac{2}{3}$  to 3, greatly exceeds short snout or tip;  $\wedge$  interorbital; maxillary reaches about  $\frac{4}{5}$  to eye, largely concealed, length 5 in head from snout tip; interorbital  $3 \frac{2}{3}$ , nearly level. Gill rakers  $4 + 8$  (?), short, slender, lanceolate, greatly less than gill filaments, which  $3 \frac{1}{3}$  in eye.

Scales about 38 to 40 (pockets)  $\wedge$  in lateral line to caudal base and 6 more out over middle of caudal basally; 4 above, 3 below, 18 (?) predorsal to occiput. Scales all very caducous, mostly fallen except on caudal peduncle and caudal basally. Scales with 3 basal radiating striae, crossing converging circuli; circuli as 22 parallel close set striae forming 2 convergent groups, in each half of scale basally, not extending apically.

D. I, 7, second ray  $1 \frac{1}{5}$  in total head, origin midway between depressed pectoral tip and caudal base or very slightly behind ventral origin; anal begins behind dorsal or much nearer caudal base than tip of depressed pectoral tip; caudal  $1 \frac{2}{5}$  (?) in head, evidently forked; least depth of caudal peduncle

3 1/8; pectoral 1 7/8; ventral 2.

Brilliant silvery white generally. Iris silvery white. Fins pale or whitish, dorsal and caudal scarcely darker.

40072 U.S.N.M. Messina. Florence Museum. Length 37 to 93 mm. 2 examples.

92242 U.S.N.M. Messina. Milan Museum. Length 97 to 108 mm. 2 examples.

1 example, U.S.N.M. Messina. Florence Museum. Length 65 mm.

Serpe oblitum (Facciola) (n. sp.)

Microstoma oblitum FACCIOLA, Nat. Sciiliana, vol.6, No.9, 1887, p.196. Sea of Messina.

Depth 6 1/4 to 6 3/5; head 3 1/5 to 3 1/4, width 2 2/5 to 2 3/4. Snout 4 1/10 to 4 1/5 in head from snout tip; eye 3, greatly exceeds short snout or interorbital; maxillary reaches 3/4 to eye, largely concealed, length 4 1/2 to 5 1/4 in head from snout tip; interorbital 4 to 4 1/4, nearly level. Gill rakers 6 + 12 (?), lanceolate, slender, little longer than gill filaments or 3 in eye.

Scales 38 (?) (pockets) in lateral line to caudal base and 11 more on latter; 3 above, 3 below, 18 (?) predorsal. Scales very caducous, most all fallen except on caudal peduncle and caudal basally.

D. I, 8, second ray 1 2/3 to 1 7/8 in total head, origin midway between eye center and caudal base; A. I, 5, first branched ray 2 2/3 to 2 3/4, origin at last third between dorsal origin and caudal base; caudal 1 1/3 to 1 1/3 in head, lobes pointed and fin forked; least depth of caudal peduncle 2 7/8 to 3 1/4; pectoral 1 3/4 (?); ventral 2 1/5.



Silvery white generally. Iris silvery white. Fins pale or whitish. Mediterranean.

40075 U.S.N.M. Messina. Florence Museum. Length 50 to 58 mm. 2 examples.

92241 U.S.N.M. Messina. Milan Museum. Length 42 to 54 mm. 3 examples.

Further pages on Serpe  
to be inserted later.

Numbering of pages begins  
at 1 again.